

**Conference draft**

**How is family income related to investments in children's learning?**

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## **Abstract**

Using two large nationally representative datasets, this chapter explores the extent to which families' investments in items and activities related to children's learning differ across the income distribution and then considers the associations between these investments and children's cognitive and behavioral development. Our analyses, while primarily descriptive, shed light on the links between income, family investments, and child outcomes and also suggest some directions for further research and policy.

Parents supplement children's in-school educational activities and promote children's learning through a wide variety of investments. For preschool-age children, family income may be invested in early care and education programs as well as enrichment items and activities such as books and toys, computers, and music and art lessons. For school-age children and adolescents, family income may be used to purchase after-school tutoring programs, enrichment activities such as music and art lessons, summer camp programs, family or educational travel, extra-curricular activities, and, ultimately, higher education.

Indeed parental investments are central to theoretical models of child development. Economic household production theory, in particular, argues that time and money are the two basic resources that parents invest in children, and that such investments in combination with children's endowments are formative in shaping children's outcomes (Becker 1991). Parents' preferences, such as the importance they place on education and their orientation toward the future, shape the extent and form of these investments as do the children's endowments and characteristics (Becker 1991; Foster 2002). For example, if a young child is talkative and enthusiastic about learning, parents are more likely to purchase children's books or take the child to the library (Raikes et al. 2006). Or, if a child appears to be lagging in development, parents may make investments (in extra lessons or tutoring) to compensate for that.

Of course, one of the strongest determinants of parents' investments is their access to economic resources. As a result, the role of budget constraints looms large in such theoretical models. Household production theory suggests that children from low-income families trail behind their economically advantaged counterparts because their parents have fewer resources to invest in their children (Becker 1991). Compared with more affluent parents, low-income parents are less able to purchase inputs for their children, including books and educational materials at

home, high quality child care settings and schools, and safe neighborhoods. Economically disadvantaged parents may also have less time to invest in children, due to the higher prevalence of single-parenthood, nonstandard work hours, and inflexible work schedules (Smolensky and Gootman 2003). However, the limited financial resources they have to spend on their children, especially during the early childhood years, remains one of the central explanations of why poor children lag behind their peers (Duncan and Brooks-Gunn, 1997; Haveman and Wolfe, 1994).

Studies of family expenditures have documented clear gaps in spending and ownership of durable goods between lower and higher income families (see, e.g. Lino and Carlson, 2009). Yet, relatively few studies have focused specifically on learning-related items and activities. Focusing specifically on such items is important because income-related gaps in spending may not be constant across items. Low-income families may prioritize child-related items, such that spending gaps on those are smaller than for other items. Alternatively, lower-income families may have other characteristics that are associated with preferences for less spending on learning-related items (low levels of parental education, for instance), and thus may spend relatively less on such items even when their incomes increase (Chin and Phillips, 2004; Lareau, 2003). Studies have documented income-related differences in particular types of investments in isolation, for example, early education programs or after-school activities (Bainbridge et al., 2005; Meyers et al., 2004; Smolensky and Gootman, 2002). This approach is also unsatisfying, as it provides just a piecemeal view of parental investments.

Showing that income is associated with such investments does not establish the extent to which increasing families' incomes would lead to greater investments. As discussed above, families' investment decisions are driven not just by budget constraints but also by their preferences and other characteristics, as well as the characteristics and preferences of children

(Chin and Phillips, 2004; Lareau, 2003). Nevertheless, prior studies do provide some evidence that when low-income families receive additional income, they increase their spending on learning-related items and activities. For instance, in the New Hope anti-poverty experiment, families used their additional income to enroll children in child care, after-school activities, and other enrichment programs (Duncan, Huston, and Weisner, 2007). Non-experimental analyses of the U.K.'s recent anti-poverty reforms found that low-income families used the additional income to increase their spending on items of enrichment and other items for children (Gregg, Waldfogel, and Washbrook, 2005, 2006).

Documenting that such investments matter for child development is equally challenging. Presumably parental investments in out-of school learning materials and activities complement students' in-school learning by teaching them diverse skills and by providing positive peer socialization contexts and experiences that broaden children's horizons. Parental investments in children's activities also create forums for the socialization of cultural knowledge and practices (Rogoff, 1990). Psychologists argue that one of the key developmental tasks of middle childhood is building a sense of competence (Eccles, 1999; Erikson, 1959), and to the extent that parental investments provide enriching contexts and opportunities to gain such competencies and develop talents, such investments will improve child wellbeing. In addition, parental investments may be protective in middle childhood, keeping children from spending unsupervised time in potentially dangerous neighborhood or peer environments (Kalil and Morris, 2006; McHale et al., 2001).

As noted above, parental investments come in several forms, and we focus on the following heuristic categories during the elementary school years in this study: extracurricular activities (lessons or participation in organized activities such athletics and boy scouts, which do

not provide an explicitly academic content); home learning materials (books, computers), and school-related investments (preschool, tutors, and private school attendance). Although theory suggests that extracurricular activities, home learning materials and school-related investments should be positively associated with children's achievement and behavior, the empirical evidence that these associations reflect causal processes is not conclusive. In the case of extracurricular activities, studies do find positive links between such activities and children or adolescent's school-related outcomes (Mahoney, Larson, and Eccles, 2005), particularly for low-income youth (Posner and Vandell, 1994, 1999), but the effects differ across activities, outcomes, and with the level of children's participation (Kalil and Morris, 2006; Ripke, Huston, and Casey, 2006).<sup>1</sup> Home learning-related materials are rarely the sole subject of study, rather such items are more often part of a more general measure of learning opportunities and literacy experiences that contribute to the quality of cognitive stimulation in the home environment (Bradley, Corwyn, McAdoo, and Garcia Coll, 2001). Studies consistently find that these broader measures are linked with higher levels of children's achievement (Bradley, Corwyn, Burchinal, McAdoo, and Garcia Coll, 2001), and that such associations may explain at least part of the associations between poverty and child outcomes (Duncan and Brooks-Gunn 2000). Finally, the literature on parents' school-related investments is vast, but again such investments are typically studied in isolation. Attending preschool and private schools is associated with improved school performance, although effects differ by the type of preschool and private school children attend

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<sup>1</sup> A distinct, but related, literature considers children's learning over the summer, or what has been termed the "summer learning gap." Although nearly all studies document that lower SES students lose ground during summer months compared to their more advantaged peers (Alexander, Entwisle, and Olson, 2007; Downey, von Hippel, and Broh, 2004), evidence suggests that parental investments per se may explain only a modest portion of such losses (Burkham, Ready, Lee and LoGerfo, 2004).

(Magnuson, Ruhm, and Waldfogel, 2007; Lubieneski and Lubienski, 2006).<sup>2</sup> A large concern with all of these research areas is the ability to attribute causal interpretations to these associations, as few studies have used rigorous methods that adequately account for the potential for omitted variable biases. Children and families select into such activities, and estimates that do not take this selection into account will be biased.

The goal of this chapter is to produce and bring together new evidence on income-related differences in parental investments in children, and the association of those investments with child developmental outcomes. Using two large nationally representative datasets, this chapter explores the extent to which families' investments in enrichment items and activities differ across the income distribution, and then considers the associations between these investments and children's cognitive and behavioral development. Our descriptive analyses shed light on the links between income, family investments in educational items and activities, and child outcomes. Although not identifying causal associations, our findings may nevertheless inform future research and policy, by pointing to investments that should be further studied and that might be potentially promising for policy experimentation.

We begin with analyses of the Consumer Expenditure Survey (CEX), a repeated cross-sectional survey which contains detailed data on family income and expenditures. In particular, we take advantage of the detailed information in the CEX about expenditures on education-related items and activities such as music and art lessons, children's books and toys, sports equipment and classes, and tutoring (see Table 1).<sup>3</sup> We use CEX data from 1997 to 2006 to

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<sup>2</sup> The literature on effects of private school attendance is vast and diverse, with attention given to how effects differ across type of private school (religious schools, charter schools, and schools funded by vouchers) as well as student characteristics (ethnic/racial minority or poverty).

<sup>3</sup> While the CEX collects data on a very extensive set of expenditures, it does not capture all the investments families might make in learning-related activities and programs. For example, it does not collect data on

describe how spending on items and activities that might supplement children's learning varies across income groups. We then use the CEX data to estimate models for how expenditures on such items change as families' total expenditure changes.

The CEX does not contain data on child outcomes, and thus we must turn to another dataset -- the Early Childhood Longitudinal Study-Kindergarten Cohort (ECLS-K) -- to estimate the links between investments in some education-related items and activities and children's development. The ECLS-K follows a large and nationally representative sample of children first assessed at the start of kindergarten in the fall of 1998, and collects data on children's academic and behavioral outcomes, as well as the provision of learning materials in the home and the child's involvement in learning-related activities outside of school (Table 2). We use these data to examine how investments in child learning vary by family income quintile and then to analyze how those investments relate to children's cognitive and behavioral development (in kindergarten and fifth grade). We conduct these analyses for the full sample and also within income quintile groups.

In the following sections, we describe the CEX data, our empirical approach to the CEX analyses, and the results of those analyses. We then report the results from the ECLS-K analyses, again beginning with a brief description of the data and methods. The chapter concludes with a discussion of our results and implications for further research and policy.

### **Data – Consumer Expenditure Survey**

The Consumer Expenditure Survey (CEX) provides detailed information on expenditures incurred by a sample of consumer units, defined as all members of a housing unit related by blood, marriage, adoption or some other legal arrangement; or two or more persons living

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expenditures on overnight camps. Nor does it capture contributions parents make to their children's schools through charitable foundations.



together who use their incomes to make joint expenditures; or a single person who is living with others but is financially independent (BLS, 2005). The CEX has two components: the Diary Survey and the Interview Survey (IS). We use the IS, which is a rotated panel in which approximately 7,500 units are interviewed every three months for five consecutive quarters, after which these households are replaced by new units.<sup>4</sup> The first quarter is a contact interview, while in the second to fifth quarters households are asked about their expenditures over the previous three months. Since the IS surveys are based on recall data on expenditures in the past three months, they suffer from response recall errors (Battistin, 2003).

We restrict the analysis to families with children, where the mother is aged 18-54. (Thus, we use the terms family and consumer unit interchangeably in referring to our sample). The CEX provides detailed demographic information on each consumer unit including respondent's age, education level, marital status, race and ethnicity, family size, number of children and their age, and number of elderly persons (aged 65 or above) in the family. We first classify quarterly expenditures into ten major categories – housing and utilities; food; alcohol and tobacco; clothing and footwear; transportation; health; leisure; personal care; education (including reading); and miscellaneous. The CEX also provides data on expenditures on more narrowly defined items. We use these detailed items to select 11 different categories of expenditures that potentially represent investments in children's learning: books and magazines; school supplies and books; college tuition and books; non-college tuition and private bus; computer; electronics; recreation lessons and activities; entertainment; sports; trips; and childcare (see Appendix 1 for details). A composite category combining these 11 items is also computed as a summary measure of expenditure on items and activities of enrichment.

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<sup>4</sup> The sample size was increased in 1999. During 1997-1998, in any single quarter the IS consisted of about 5,000 units.

To take account of differences in family size and composition, we adjust expenditures in the ten major categories for each family using the Organization for Economic Cooperation and Development (OECD) equivalence scale, which assigns a weight of 0.67 to the first adult, 0.33 to all other persons in the household over 17, and 0.2 to children 17 or under. The same equivalence scale is used to adjust expenditures on books and magazines, computer, sports, trips, and electronics. Other items that would be used only by adults or children are divided by the number of adults or children in the family who are likely to use these goods and services. Expenditures are expressed in 2003 dollars using the Personal Consumption Expenditure deflator of the Bureau of Economic Analysis. Since the expenditure is per quarter, we use a 3-month moving average of the personal consumer expenditure deflator.

Income data in the CEX are collected in the second and fifth interviews of a consumer unit, and cover the 12 months prior to the date of interview. Incomes in the third and fourth interviews are repeated from those reported in the second interview unless a consumer unit member over the age of 13 is new to the consumer unit or has not worked in previous interviews and has now started working. In these cases, incomes in the third and fourth quarters are revised to include the incomes of the new earners. In 2004, CEX started imputing missing income data. However, there is no imputation of missing income for the years prior to 2004. Therefore, in the empirical analysis that uses family income data (presented in the Appendix Tables 2-3) we exclude observations with imputed incomes. To reduce the likelihood of temporary fluctuations in income unduly influencing the analysis, we restrict the samples to families with non-negative incomes in the analyses reported in Appendix Tables 2-3.<sup>5</sup> Income data are expressed in 2003 dollars using the 12 month moving average of the Personal Consumption Expenditure deflator.

### **Empirical Model – Consumer Expenditure Survey**

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<sup>5</sup> One percent of the observations in our CEX sample have negative incomes.

Our objective is to understand the relationship between permanent family incomes and expenditures on items of enrichment and developmental activities for children. In this, our analysis is guided by Friedman's permanent income hypothesis, which states that families base their consumption on what they consider their permanent or expected incomes, and not their current incomes. Thus, the transitory changes in incomes that families face have little effect on their consumption expenditures (Friedman, 1957). The Consumer Expenditure Survey, the data we use, provides information on the current annual income of families, which includes a transitory component (unexpected or temporary gain/loss) as well. Therefore, following previous research, we use total expenditure as a proxy for permanent income and compute expenditure elasticities (Archibald and Gillingham, 1981; Benton, 1969; Deaton and Muellbarer, 1980; Ogaki, 1992; Wagner and Mokhtati, 2000). A second reason for estimating expenditure (rather than income) elasticities is the poor quality of income data in the CEX (see Wagner and Mokhtati (2000) for a detailed discussion on income data in the CEX; see also Meyer and Sullivan (2003)). Nevertheless, in supplementary analysis we present income elasticities (Appendix Table 3).

We begin with a simple reduced form equation as described here:

$$(1) E_{ict} = \alpha_m + \alpha_t + \beta TE_{ct} + \Gamma X_{it} + u_{it}$$

where  $E_{ict}$  is the quarterly annualized expenditure on item  $i$  by consumer unit  $c$  in year  $t$ , which is predicted by total family expenditure in year  $t$ , ( $TE_{ic}$ ), and family characteristics ( $X_{it}$ ) namely: mother's age (denoted by a set of dummy variables for age groups: 18-22, 23-27, 28-32, 33-37, 38-42, 43-48 and 49-54), mother's education (less than a high-school degree, high-school, some college, and at least a BA degree), race/ethnicity (non-Hispanic white, non-Hispanic blacks, Hispanics, and others), number of adults in the family (other than the reference person), number

of children in the family, number of persons over 64 living in the family, and whether the family lives in an urban area.  $\alpha_m$  denotes month effects that adjust for seasonal changes in expenditures and  $\alpha_t$  estimates year effects adjusting for time varying factors such as national level changes in prices, tastes and preferences, and policies. The coefficient  $\beta$  estimates the marginal propensity to spend on item  $i$ . To adjust for potential non-independence among observations belonging to the same family, standard errors are computed by clustering at the family unit.

Equation (1) estimates a linear association between expenditure on item  $i$  and total family budget. To allow for a less restrictive association between the two, we estimate equation (1) by stratifying families into quintiles of total family expenditure relative to their needs. We compute the ‘budget to needs ratio’ as total expenditure of a consumer unit divided by the poverty threshold corresponding to the unit’s family size and structure. The data on poverty thresholds are taken from the Census Bureau. While stratifying the sample in this manner permits a less restrictive functional form, using family budgets to stratify data in a study of the association between family budgets and expenditure on items of enrichment is potentially problematic and may yield biased estimates. To overcome this limitation, we also do the analysis by stratifying families by mother’s education into four categories: less than high-school, high-school, some college, and BA or higher, and estimate equation (1) for each group separately.

It is also of interest to us whether the association between expenditures on items of enrichment and family budgets differs for families with pre-school children versus families with school-age children, since expenditures on such items may well vary by the age of the children. We investigate this by stratifying our sample by the age of children: families with preschool children only (all children less than age 6); families with school-age children only (all children age 6 or higher) and families with both preschool and school-age children.

Coefficient  $\beta$  in equation (1) estimates the association between family budgets and spending on children's enrichment and developmental activities. Ideally, we would like to estimate causal links, if any, between family budgets and expenditures on enrichment items. Estimation of a causal relationship, however, would require that variation in total budgets is unrelated to other unobserved factors that influence family spending patterns. It is unlikely that such random variation exists in our cross-sectional data. Thus, it is quite possible that the cross sectional findings are biased by the presence of omitted variables.

Fortunately, we can take advantage of the panel feature of the CEX data and adopt a second approach to estimating the associations between total expenditure and expenditures on education-related items. Each family in the CEX is interviewed for 5 consecutive quarters. We use the longitudinal aspect of the CEX, and examine the association between changes in total expenditure and expenditure on items of enrichment within a family unit. Mathematically, our second approach can be described by equation (2):

$$E_{ict} = \alpha_i + \alpha_m + \alpha_t + \beta TE_{ct} + X_{it}\Gamma + u_{it},$$

where  $\alpha_i$  denotes family specific effects. We estimate the longitudinal analyses using fixed effects models. These models are useful in reducing omitted variable bias because any permanent family-level confounds are removed, although bias due to time-varying confounds will likely remain. We also conduct these analyses across subgroups defined by expenditure quintiles, by mother's education, and the age of children.

## **Results - Consumer Expenditure Survey**

Table 3 presents mean annualized expenditures on items and activities of enrichment. Families' spending patterns may differ in two ways. First, they may differ because the amount of resources available to be spent differs. Second, families may allocate resources differently across

categories of spending, even if their total amount of spending is similar. For this reason, we present both total amount of expenditure for each category as well spending in specific categories as a proportion of all expenditures. In Appendix Table 1 we also report mean annualized total expenditure and expenditures on the major 10 categories for the full sample and for sub-samples defined by expenditure quintiles, race/ethnicity, family type, mother's education, and child age. For brevity, we do not discuss them here.

Figures in Table 3 show that the share of total expenditure allocated to items of enrichment rises with each expenditure quintile (quintile 1 represents families with the lowest expenditures, while quintile 5 represents families with the highest). Families in the bottom quintile allocate three percent of their total expenditure on enrichment items; families in the top two quintiles spend nine percent on items of enrichment. The gap in absolute expenditures on items of enrichment is wider. In dollar terms, families in quintile 1 spend almost a third of what families quintile 2 spend and less than a fifth of what families in quintile 3 spend on items of enrichment.<sup>6</sup>

A similar gap emerges when the sample is divided by mother's education. However, when the sample is stratified by mother race/ethnicity, family type (single mother versus two parent families), or child's age, the gap in the proportion of spending on items of enrichment is relatively modest suggesting that most of the difference in absolute spending on enrichment activities among these groups is likely due to the size of their total budget, rather than the allocation of resources across budget categories.

In the bottom quintile, the bulk (86%) of the expenditure on items of enrichment goes to sports, family trips, electronics, child care and computers. Families in higher quintiles allocate a

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<sup>6</sup> In supplemental analyses, not shown but available on request, we checked the sensitivity of our results for the bottom quintile by repeating the analysis for families at the 5<sup>th</sup> to 20<sup>th</sup> percentile (dropping those below the 5<sup>th</sup> percentile) and found that the results are similar.

somewhat larger proportion on other items of enrichment such as books and magazines, education (college, non-college and school supplies), recreation activities and lessons, and entertainment. A similar story emerges when the sample is stratified by mother's education – more educated families allocate a larger proportion on the above-mentioned other items of enrichment than do less educated families. As expected, families with only pre-school children spend a relatively large proportion on childcare (45% of their total expenditure on items of enrichment), while families with only school age children spend relatively more on school supplies, college and non-college tuition (including private bus), recreation lessons and activities, and books and magazines.

*Multivariate results - cross-sectional estimates of the association between total expenditures and expenditures on items of enrichment*

Table 4 presents the association between total expenditures and expenditures on items of enrichment based on the model described in equation (1) that adjusts for a rich set of demographic variables. We first do the analysis using the full sample of families, and then stratify families using three different kinds of categories: quintiles of expenditure to needs ratio (adjusting for family size and structure), levels of mother's education, and children's age.<sup>7</sup> Standard errors clustered on consumer units are reported in parenthesis, and expenditure elasticities computed at the mean expenditure are in straight brackets.<sup>8</sup> Note that we use the term elasticity for convenience. Since total expenditure is not exogenous, our measure of elasticity

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<sup>7</sup> A similar analysis of the association between income and expenditure on items of enrichment is presented in Appendix Table 3. Appendix Table 2 reports the description of the sample in the analysis in Appendix Table 3.

<sup>8</sup> Elasticity is defined as the percent change in expenditure on an item divided by the percent change in total expenditure. An elasticity greater than 1 indicates that the percent change in expenditure on an item is greater than the associated percent change in total expenditure; an elasticity less than 1 indicates that the percent change in expenditure on an item is less than the associated percent change in total expenditure.

does not necessarily suggest any causal association between total expenditure and expenditure on items of enrichment.

Estimates in row 1 of Table 4, for the full sample, show that a \$1000 increase in family expenditures (as a rough proxy for a \$1000 increase in permanent income) is associated with a \$91 increase in expenditure on items of enrichment. The estimated elasticity for expenditure on enrichment items is 1.1 suggesting that as income increases the proportion of income devoted to items of enrichment increases by a somewhat higher proportion. The bulk of the increase is in expenditures on trips, followed by expenditure on non-college tuition and private bus, childcare, college tuition and books. The elasticity of expenditure is less than 1 for books and magazines, computers, electronics, childcare and school supplies and books, and more than 1 for the other six items.

As mentioned earlier, it may be that increases in income and expenditure may have different effects at different points in the income and expenditure distribution. Accordingly, we estimate similar models by expenditure quintile. The results indicate that estimates of elasticities for items of enrichment for quintiles 1-4 are greater than 1 for the combined category of items of enrichment and for each individual item (with one exception – the elasticity of expenditure on books and magazines for the 4<sup>th</sup> quintile), suggesting that families in the bottom four quintiles of the expenditure distribution allocate a higher proportion of their budgets on items of enrichment as budgets grow. Families in the top quintile, on the other hand, spend a relatively smaller proportion of their budget on items of enrichment as income rises. In terms of spending on specific items, families in the top quintile have elasticities of expenditure lower than 1 for all items of enrichment, except sports and college tuition (including books) and non-college tuition and private bus.



As mentioned, the analyses by expenditure quintiles suffer from the fact that we have used a right hand side variable to stratify the data, and thus the resulting estimates are likely to be biased. For instance, any increase (decrease) in total family expenditure that occurs above (below) the expenditure cutoff for a given quintile is not captured by our quintile level estimates. Therefore, we next estimate the marginal propensity to spend and elasticities for families stratified by mother's education. Among families in the lowest education group, a \$1000 increase in total expenditure is associated with a \$51 increase in expenditure on items of enrichment. A \$1000 increase in total expenditure is associated with a \$62 increase in spending on items of enrichment for families with high-school graduate mothers, a \$79 increase in families where the mother has some college education, and a \$113 increase in families with college graduate mothers. For all groups, the expenditure elasticity of enrichment items (all items combined) is more than 1.

In terms of detailed items, families with children have much higher elasticities for college tuition and books, and non-college tuition and private bus than the other items of enrichment, irrespective of mother's education. Interestingly, the expenditure elasticity of computers is more than 1 for only the least educated families, and the elasticity of expenditure on sports is more than 1 for only the most educated families. For all other items, elasticities do not differ much by mother's education.

The bottom three rows of Table 4 report estimates for families stratified by children's age. The expenditure elasticity is estimated to be somewhat less than 1 for families with pre-school children only and somewhat higher than 1 for families with school- age children (this is true both for those with only school age children as well as those with both preschool and school age children). In the detailed item-wise analyses too, point estimates show that families with only

pre-school children have lower elasticities of spending on most items except for childcare and electronics than families with school-age children only. Similarly, point estimates show that families with both preschool and school-age children have higher elasticity of spending on most items of enrichment than families with pre-school children.

*Multivariate results – longitudinal analyses of the association between changes in total expenditures and changes in expenditures on enrichment items*

Table 5 reports the marginal propensities to spend and elasticities, taking advantage of the longitudinal aspect of the data. The results from fixed effects models in Table 5 suggest that a \$1000 increase in total expenditure is associated with a \$59 increase in expenditure on items of enrichment. This point estimate is about a third lower than the estimated marginal propensity in the cross-sectional analysis. The fixed effects model yields an expenditure elasticity of 0.75, again lower than the estimate from the cross-sectional analysis. As in the cross-sectional analysis, the elasticity is more than 1 for families in the bottom four quintiles, and less than 1 for families in the top quintile. Again, these estimates may be biased since the data are stratified by family expenditures, the key right hand-side variable for our analyses. We therefore also estimate these models stratifying families by mother's education.

The fixed effects models, stratified by mother's education, estimate the elasticity of enrichment expenditure to be less than 1 for all families, irrespective of mother's education, and point estimates indicate the elasticity for the most highly educated families (families in which mothers are college graduates) to be higher than those of other groups.. When we re-estimate the models stratifying by the children's age, point estimates indicate that families with only preschool children have much lower elasticities of enrichment items than families with school

age children, indicating that families are more likely to increase their financial spending on children as they grow older.

To sum up, our analyses, using the cross-sectional as well as longitudinal data, suggest that families increase expenditures on items of enrichment as their budgets (permanent incomes) rise. The estimate of the marginal propensity to spend on items of enrichment from fixed effects models (longitudinal analysis), however, is about two thirds of the estimates using cross-sectional data. This is true of the estimates for the full sample as well for samples stratified by mother's education and child's age. The fact that the associations between permanent income and expenditures on enrichment items are smaller in the fixed effects models suggest that at least a portion of these associations reflect unobserved differences between lower and higher income families, which may be confounded with increases in expenditures. Nevertheless, even the reduced associations in the fixed effects models indicate that as family incomes rise, expenditures on items of enrichment rise as well.

How do these expenditures relate to children's development? We turn to that question next.

#### **Data – Early Childhood Longitudinal Study, Kindergarten Cohort of 1998-99**

The data for this portion of the analysis come from the Early Childhood Longitudinal Study, Kindergarten Cohort of 1998-99 (ECLS-K), a nationally representative sample of children attending kindergarten in the fall of 1998. We use information from the fall of 1998 (kindergarten fall), spring of 1999 (kindergarten spring), spring of 2000 (for most children, first grade), spring of 2002 (for most children, third grade), and spring of 2004 (for most children, fifth grade). The ECLS-K includes academic assessments, child, parent, teacher and school administrator surveys, and observational ratings of school environments.

We use two samples of children from these data. The sample used for our kindergarten analysis includes some 19,805 children with valid reading or math outcomes in the spring of kindergarten. The sample used in our fifth grade analysis includes 10,985 children who had valid math or reading outcomes in the spring of kindergarten and the spring of fifth grade. Non-response and missing data are prevalent in these data. For example, of children with valid achievement assessments in the spring of kindergarten about 14% had parents who did not complete the kindergarten fall parent interview and 8% had parents who did not complete the kindergarten spring parent interview. Some attrition in the later years was due to study design, in particular, only a portion of children who changed schools were followed. To handle missing data on the independent variables, we used multiple imputation techniques using STATA's software (ICE) to create and analyze five datasets.

*Outcomes: Children's Academic Achievement and Behavior*

Children's math and reading skills were assessed by instruments that were created for the ECLS-K by a team of experts, with some items adapted from existing tests. Reported reliabilities for the tests were quite high for all assessments (Tourangeau, Nord, Pollack, and Atkins-Burnett, 2006). The math and reading outcomes are transformations of latent ability scores into standardized t-scores that have a mean of 50 and standard deviation of 10 (based on the full sample distribution).<sup>9</sup> Consequently, the scores should be interpreted as children's ability relative to their peers, and can be translated into effect sizes by dividing regression coefficients by 10.

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<sup>9</sup> The skills tests were conducted in two-steps. Children were first given common questions. The second set of questions then differed in difficulty, depending on performance in the first step. Because children did not answer the same questions, the scores were calculated using Item Response Theory (IRT), which uses patterns of right, wrong, and missing answers and the difficulty of questions to place each child on a continuous ability scale. The resulting score is an estimate of the number of questions the child would have correctly answered had he or she been asked all available questions.

Teacher reports of children's externalizing and internalizing behavior measure children's classroom behavior.<sup>10</sup> Externalizing problem behavior refers to aggressive behavior as indicated by a five-item scale measuring how frequently the child fights, argues, gets angry, acts impulsively, or disturbs ongoing activities. The internalizing items tap teachers' perceptions of the child's anxiety, loneliness, and sadness. These scores were standardized (for the full sample) to have a mean of 0 and a standard deviation of 1 and, and as such regression coefficients can be interpreted as effect sizes.

### *Family Investments*

Our key independent variables are a set of items that measure or proxy for parents' investments in children.<sup>11</sup> These measures fall into several rough categories: lessons (foreign language instruction, crafts, drama, art, music, and dance) and participation in organized activities (athletics, performing arts, and clubs)<sup>12</sup>; schooling (preschool attendance, private school attendance); and learning materials in the home (audio CDs, books, computer). Means and standard errors for these variables are provided in Table 6 (for imputed data), and additional descriptive details about these measures can be found in Appendix Table 5.

The set of items we use differ slightly for our kindergarten and fifth grade analyses. For the kindergarten analysis, almost all of the information we use is reported by parents during the spring of kindergarten. For the fifth grade analysis, we use additional information reported by parents at later waves (spring of first grade, third grade, and fifth grade), although several items are only asked in kindergarten fall (drama and craft lessons; number of audio CDs; preschool

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<sup>10</sup> These are adapted from the Social Rating System (SRS, Gresham and Elliot, 1990).

<sup>11</sup> We recognize that some of these items or activities may be provided by communities, but we nevertheless view them as parental investments since parents have some control over the community their family lives in and also over whether or not they enroll their child in offered activities.

<sup>12</sup> We also created a measure of the number of lessons or activities that children participated in and used this as an independent variable in our kindergarten analysis (rather than entering each activity separately). We found that these summary measures did not predict children's kindergarten spring outcomes, once a measure of their fall skill or behavior was included as a control.

attendance, and foreign language instruction). For those items that are repeated, we averaged values across the kindergarten, first grade, third grade, and fifth grade data. In addition, we included two items that were only asked of parents in the spring of third grade (newspaper receipt and magazine receipt).

We also use measures of total household income in our analyses. Total household income is reported by parents in the fall or spring of kindergarten. We use this information to code families into five income quintiles.

### *Covariates*

We take advantage of the richness of the ECLS-K data to construct a comprehensive set of covariates that include demographic characteristics, parental values and characteristics, neighborhood quality, sleeping habits, family routines, home learning activities, as well as teacher and school characteristics. For all analyses, these measures are created from data collected in the spring and fall of kindergarten. More details about the controls are provided in Appendix Table 5.

### **Empirical Model – ECLS-K**

Our analyses are designed to better understand both the extent to which reading and math skills as well as classroom behavior differ by family income, as well as the possible consequences of differing levels of investment for children's achievement and classroom behavior during elementary school. We undertake two sets of analyses. The first provides a short term perspective, by considering the associations between family investments during the kindergarten year and children's kindergarten spring outcomes. The second considers the associations between cumulative family investments during the elementary school years on

children's fifth grade outcomes. In both cases we estimate OLS regressions, and our most complete estimation model take the following form:

$$Y_{it} = \beta_1 + \beta_2 Income_{iK} + \beta_3 Demo_{iK} + \beta_4 Invest + \beta_5 Y_{iK} + \beta_6 Extend_{iK} + u_{it}$$

$Y_{it}$  reflects the achievement or behavior of child  $i$  at time  $t$  (either spring of kindergarten or fifth grade). *Income* is a vector of family income quintile indicators measured in the fall of kindergarten (the lowest income grouping serves as the reference category). *Demo* is a basic set of child and family demographic characteristics measured in the fall of kindergarten, and *Extend* represents a vector of other family characteristics, measured in the fall or spring of kindergarten, that might be related to both children's achievement and family investments. *Invest* represents a vector of family investments measured either in the spring of kindergarten or cumulatively across the kindergarten, first grade, third grade and fifth grade data. Finally  $Y_{iK}$  represents the inclusion of a lagged dependent variable as a predictor in our regressions (a measure of the outcome taken in the fall of kindergarten). Because the outcome measures are standardized, coefficients represent relative differences in achievement compared with all other students.

We estimate six versions of equation (3) for each of the four outcomes. The first model includes only the vector of income quintile indicators, thus providing an estimate of the income gradient for each outcome. The subsequent models enter the remaining vectors of predictors sequentially.

Of particular interest are estimates of the association between family investments and the child outcomes from the final two models, as these include a measure of the outcome in the fall of kindergarten. This lagged dependent variable approach is especially effective in reducing the potential of omitted variable bias due to unobserved heterogeneity, as the fall kindergarten measure of skills or behavior not only controls for prior skills or behavior, but also serves as a

rough proxy for all of the experiences and family characteristics associated with it. We are concerned that the association between family investments and children's outcomes may differ across the income distribution; therefore we estimate our most complete model separately within each family income quintile.<sup>13</sup>

## **Results – ECLS-K**

Descriptive statistics for the ECLS-K sample display income gradients in math and reading achievement as well as classroom behavior. On average, kindergarteners in the lowest family income quintile have reading and math scores of about 45, as compared to about 50 for children from the middle income quintile and about 55 for children from the top income quintile. Patterns for behavior problem scores, where a higher score indicates more problems, also display a gradient although the total size of the gap is considerably smaller. Kindergarteners from the lowest income quintile have average scores greater than .15, as compared to scores of around 0 for the middle income quintile and scores of about -.15 for the top income quintile.

The raw data also indicate gradients in family investments in the set of enrichment items and activities. In some cases, investments increase as family income rises (see, for example, the family's report in the kindergarten survey of the number of CDs or children's books in the home,). In other cases, however, receipt of these investments does not differ much across the lower and middle income quintiles, but is sharply higher among the top income quintile (see, for example, the family's report in the kindergarten survey as to whether the child receives music lessons).

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<sup>13</sup> An alternative way to analyze the ECLS-K longitudinal data is to estimate hierarchical linear models that model children's achievement and behavior trajectories using data from the spring of kindergarten, first grade, third grade, and fifth grade year. We estimated such models, predicting children's initial level and slope as a function of their cumulative activities, but found there was little to no effect of family investments on children's achievement trajectories.



Overall, the descriptive statistics suggest that children in lower-income families have both poorer outcomes and lower levels of family investments in enrichment items and activities. However, they can not tell us whether children's differential enrollment in and receipt of enrichment items and activities accounts for any of the differences in their outcomes. To explore this, we turn next to regression results.

*Multivariate results – lagged dependent variable model analyses of the association between family income quintiles, family investments, and child outcomes at spring kindergarten*

Table 6 presents results from regression models for reading, math, externalizing behavior, and internalizing behavior in spring of kindergarten.<sup>14</sup> Model 1 includes the child's household income quintile (quintile 1, the lowest income quintile is the omitted reference category) as the only predictor. Results suggest a strong income gradient for all four outcomes, although somewhat stronger gradients for achievement compared with behavior. Model 2 adds a set of demographic controls (listed in Appendix Table 5), which reduces the income gradients substantially (by 50% or more, depending on the outcome). This is not surprising given that family income is confounded with many other family characteristics that may be associated with children's developmental outcomes. Nevertheless, even after including demographic controls, significant associations between the child's family income quintile and the child's outcomes persist.

Model 3 adds the set of family investments as independent variables. Looking first at the results for the two cognitive outcome measures, we can see that not all of these investments are significantly related to children's outcomes, but a substantial share – 7 of the 14 we consider – are significantly associated with both reading and math scores (this set includes preschool, private school, music lessons, participation in organized athletics, participation in organized

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<sup>14</sup> Detailed results by income quintile are shown in Appendix Table 6.

clubs, participation in performing arts, number of children's books, and home computer for the child's use). Despite including a host of demographic controls, there is reason to worry that the resulting estimates are spurious rather than causal. To consider this question, our next model introduces a control for the child's score on the same outcome from fall kindergarten, and most of these associations fade to non-significance (or become significantly negative). Exceptions are participating in organized athletics and having a computer for the child's use, both of which continue to be positively associated with spring of kindergarten reading and math scores, although the magnitude of the associations are quite small. Adding more extensive family and school controls (in Model 5) does not change this overall pattern of results. Fully controlled models estimated within income quintiles (Appendix Table 6) suggest that the association between having a computer at home and higher reading and math scores is particularly pronounced in the bottom two income quintiles.

If we thought these models were indicative of causal associations, we might conclude from the above results that most family investments (with perhaps the exception of organized athletics and computers) are not causally related to children's cognitive outcomes, at least in the short term. However, given the limitations of the ECLS-K data and the methods available to us, we would caution against a sweeping causal interpretation. On the one hand, there are many family-level factors that are likely associated with these investments, and that likely matter for child achievement, that we are not able to control for. At the same time, by controlling for the child's fall kindergarten score, we only estimate the added value of family investments that occur after children's entrance into school. At best, our results can tell us whether, holding constant fall kindergarten scores, investments during the kindergarten year are associated with better spring

scores. The answer to that question seems to be no, again with the possible exception of organized athletics and home computers.

These regressions also shed some light as to the extent to which the income gradients we observe in reading and math skills covary with or are explained by, in an accounting sense, disparate family investments. Moving from Model 2 to Model 3, when we add the family investments, we do see that the income gradients fall, in some cases fairly substantially. So differences in family investments do covary with or help explain, in an accounting sense, some of the income differentials, with a particularly large effect for the upper quintiles. Yet the fact that the family investments are for the most part not significant predictors of achievement, once fall kindergarten test scores are entered into the model, indicates that such covariance and accounting is largely spurious rather than causal.

The results for the behavioral outcomes, also shown in Table 7, are quite different from those for the cognitive outcomes, and also differ by the type of behavior considered. Again, when only income quintiles are entered as predictors of children's classroom behavior, we see a significant income gradient. When we add our measures of family investments in Model 3 for externalizing behavior problems, we find that only a few are significant (for example, preschool is associated with more externalizing behavior problems, as is attending private school, while having a home computer is associated with fewer externalizing problems), and adding these items has little effect on the magnitude of the estimated income quintile coefficients.

Turning to internalizing behavior, we see a slightly different pattern. Entering the enrichment items in the regression slightly reduces the income quintile coefficients, and somewhat more items are significantly related to internalizing behavior problems (this includes having more audio CDs in the home, having more books in the home, dance lessons, and

participation in organized athletics). These latter results hold up even after adding a prior measure of children's internalizing behavior (Model 4) and more extensive controls (5), although, again we caution against a strong causal interpretation of these findings.

*Multivariate results – lagged dependent variable model analyses of the association between family income quintiles, family investments, and child outcomes at spring of fifth grade*

Table 8 presents results for a similar set of regression models, but this time estimated using data on children's outcomes in the spring of fifth grade.<sup>15</sup> We take advantage in these models of the repeated observation of some family investments to create measures of cumulative investments. Again, our results indicate sizable income gradients (Model 1) for all four fifth grade outcomes. As was the case with kindergarten measures, these disparities are reduced considerably after we control for a set of demographics (Model 2).

In the fifth grade math and reading skills models, we see that adding family investment measures (Model 3) has little effect on the magnitude of the income gradients for reading (except for the top income quintile), whereas it reduces the income gradients for math by about half. The specific investments that are significantly related to these varies across outcome, and in some cases, have a negative association that probably signals selection into these investments. For example, having a tutor is negatively associated with both reading and math. The items that are significantly related to both reading and math in a positive direction include participating in music lessons, participating in organized clubs, number of books in the home, and having a computer in the home. Detailed analyses by income quintile, shown in Appendix Table 7, suggest that this latter association, for computers, is particularly strong in the bottom income quintile, but also significant in the next to bottom and middle quintiles. The family receiving a newspaper in third grade is also positively associated with reading scores in fifth grade. The

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<sup>15</sup> Detailed results by income quintile are shown in Appendix Table 7.

magnitude of these associations, however, is quite small. Most translate into effect sizes of less than .05.

Results for the behavior problem outcomes are again different from the cognitive outcome results, and vary by the behavior outcome considered. For externalizing behavior, adding controls for demographics (Model 2) explains most of the income gradients, except for a portion that remain for the top two income quintiles, and adding the measures for investments explains about half of those these remaining differences. With regard to the results for specific investments, relatively few are significantly related to externalizing behaviors, and several of these likely reflect selection (preschool, craft lessons in kindergarten, and having a tutor are associated with more such behavior problems, while having a computer is associated with fewer). For internalizing problems, a larger share of the income gradients remain after controlling for demographics, although only the top two income quintiles differ from income quintile 1. Again about half of these remaining effects remain after measures of family investments are added.. Several specific investments are significantly linked to internalizing problems, even after controlling for prior levels of such problems and for extended controls, with some of these (such as preschool, craft lessons in kindergarten, organized clubs, art lessons, and tutors) related to more such problems while others (such as dance lessons, organized athletics, and receiving a newspaper) are related to fewer. Again it is difficult to know which of these might reflect selection and which might reflect causal associations.

## **Conclusion**

This chapter provides some new evidence on how family investments in learning-related items and activities vary across the income distribution. The results from the Consumer Expenditure Survey suggest that families increase expenditures on items of enrichment as their

overall expenditures (our rough proxy of permanent income) rise. This is true both in cross-sectional estimates and longitudinal estimates, which examine changes in family expenditures within families over time. Estimates of the marginal propensity to spend on items of enrichment from our fixed effects longitudinal analysis, however, are about two thirds of the estimates arising from our cross-sectional analysis. This is true for the full sample as well for samples stratified by mother's education and child's age. The fact that the associations between total expenditure and expenditures on enrichment items are smaller in the fixed effects models suggest that at least a portion of these associations reflect unobserved heterogeneity between lower and higher income families, and thus indicate that at least some the association is spurious rather than causal. Nevertheless, even the reduced associations in the fixed effects models suggest that as family incomes rise, expenditures on items of enrichment rise as well.

Our analysis, as any analysis based on consumer expenditures, is constrained by the fact that we only measure the money families invest in children's enrichment activities, but not the quality of the services they purchase. In addition, some of the other investments that families make may indirectly affect their investments in children. For instance, as incomes rise families may move to better neighborhoods with the objective of accessing better quality schools, or sports clubs for their children. In our analysis, this will be reflected as an increase in expenditure on housing, while in effect some of the increased expenditure on housing in response to an increase in income may be incurred to access better quality services for children.

Our analyses of data from the Early Childhood Longitudinal Study, Kindergarten Cohort of 1998-99, confirm that there are sizable income-related gaps in children's enrichment items and activities. These gaps exist alongside substantial income-related gaps in reading and math skills, as well as in externalizing and internalizing behavior.

How consequential are the gaps in family investments in accounting for the gaps in children's cognitive and behavioral development? Our results, while not conclusive, suggest that income-related gaps in family investments measured in this study may play a small role in accounting for income-related gaps in development during middle childhood. That is, in an accounting sense, when we add measures for such items and activities to our regression models, the coefficients for the income quintile indicators are typically reduced. However, as emphasized earlier, this accounting exercise only suggests how closely investments and income quintiles covary with each other and with the outcomes, but does not indicate that these associations are causal. In addition, many of our findings are inconsistent across outcomes or models, and others likely reflect the selection of children into particular types of activities. Thus, we caution against placing a causal interpretation on these findings. Rather, we view them as suggestive, pointing to associations and investments that could fruitfully be explored in further research or in policy experimentation. For instance, we find fairly consistent positive associations between having a computer in the home and better reading and math scores, particularly for lower-income children. We also find some intriguing associations between organized activities and reductions in internalizing problems for children. Both of these would be worth exploring further.

There are several key limitations to our study. First, although the ECLS-K is unusually rich in some areas, it does not provide comprehensive or detailed information on the full range of family investments that may be of interest. For example, we do not have any information on family vacations and travel. Nor do we have any information about the quality of the extracurricular activities or intensity of students' involvement in these activities. Although there is some information about school quality, presumably an important aspect of parental investment during middle childhood, it is not straightforward to measure it with the available survey data.

More intensive studies with better information about particular types of investments are likely needed to improve our understanding of how family investments influence children's development. Second, family investments are not randomly distributed across children; they reflect parents' and children's preferences, budget constraints, and opportunities. As such, it is difficult to model causal associations between family investments and children's outcomes. This suggests that greater attention should be given to understanding how families allocate resources. Third, our analyses have not considered the extent to which the effects of investments may vary across different types of children and families. Future research should consider such heterogeneity. Fourth, the outcomes we study are only a small subset of important domains of children's functioning. For example, family investments may be associated with other dimensions of children's mental health as well as their physical health. Finally, this study was unable to study investments that families made during early childhood, since the data available from the ECLS-K primarily cover investments during middle childhood only. The relatively small and sparse associations of family investments and children's school outcomes we found during middle childhood is perhaps not surprising, as much of the literature points to family investments mattering most during early childhood (Duncan & Brooks-Gunn, 1997).

In spite of these limitations, our results confirm that the gaps in school achievement between children from different parts of the income distribution are already large at school entry, and show little sign of diminishing as children move through school. Even if family investments contribute only a small share to such gaps, it is worth understanding that contribution and the role that community or school policies might be able to play to level the playing field.



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**Table 1: Measures of Family Investments in Children, Consumer Expenditure Survey**

Item	Description
Recreational lessons and other instruction	Fee for recreational lessons and other instruction, including tutoring, membership fees for country clubs, health clubs, and other recreational organizations, civic, service, or fraternal organizations; fees for participant sports; management fees for recreational facilities.
Babysitting, nursery school and day care centers	Babysitting or other child care in your own home; babysitting or other child care in someone else's home; and other expenses for day care centers and nursery schools, including tuition; and school books, supplies, and equipment for day care centers and nursery schools.
College tuition & books	Tuition for college; schoolbooks, supplies, and equipment for college.
School books, supplies and equipment	School books, supplies, and equipment for elementary and high school; school books, supplies, and equipment for college; school books, supplies, and equipment for other schools; rentals of books and equipment, and other school-related expenses
Books and magazines (not related to school)	Books through book clubs, books not through book clubs, magazine or newspaper subscription, encyclopedia and other sets of reference books  magazine or newspaper, single copy
Non-college tuition & school transportation	Tuition for elementary and high school, and private school bus
Computers	Computers, computer systems, and related hardware for non-business use; computer software and accessories for non-business use; repair of computers, computer systems, and related equipment for non-business use; and computer information services.
Items of enrichment: sports and other	Ping-Pong, pool tables, other similar recreation room items, general sports equipment, and health and exercise equipment; bicycles; camping equipment; hunting and fishing equipment; winter sports equipment; water sports equipment; other sports equipment; toys, games, hobbies, tricycles, and battery powered riders; playground equipment; rental and repair of sports, recreation, and exercise equipment; musical instruments, supplies, and accessories; and rental and repair of musical instruments, supplies and accessories.
Items of enrichment: electronics	Televisions; VCR, video disc player, video camera, and camcorder; Video cassettes, tapes, and discs; TV computers games and computer game software; streaming or downloaded video files; radio; tape recorder and player; sound components, component systems, and compact disc sound systems; accessories and other sound equipment including phonographs; satellite dishes; records, CDs, audio tapes;

	streaming or downloaded audio files; rental of televisions; rental of VCR, radio, and sound equipment; photographic film; film processing; rental and repair of photographic equipment; photographic equipment; rental of video cassettes, tapes, and discs; and online entertainment and games.
Out of town trips	Travel costs for out of town trips; lodging away from home on trips; entertainment expenses on out-of-town trips, including admissions to events, museums and tours; rental of all campers on out-of-town trips; rental of other vehicles on out-of-town trips; rental of motorized camper; rental of other RV's; fees for participant sports on out-of-town trips; admission fees to sporting events on out-of-town trips; miscellaneous recreational expenses and services on out-of-town trips.
Entertainment	Admission fees for entertainment activities, including movie, theater, concert, opera or other musical series (single admissions and season tickets); and admission fees to sporting events (single admissions and season tickets)

Table 2: Measures of Family Income and Investments in Children, ECLS-K

	Kindergarten Fall	Kindergarten Spring	First Grade Spring	Third Grade Spring	Fifth Grade Spring
Total Family Income*		X	X	X	X
Early Education (including Head Start): (yes/no)	X				
Private School attendance (yes/no)	X	X	X	X	X
Extra-curricular activities**:					
music lessons		X	X	X	X
art classes or lessons		X	X	X	X
non-English language classes		X	X	X	X
dance lessons		X	X	X	X
drama lessons		X	X	X	X
organized performing arts programs		X	X	X	X
organized athletic activities		X	X	X	X
organized clubs		X	X	X	X
Number of children's books in home (0-200)	X		X	X	X
Number of children's audio tapes, CDs, records (0-100)	X		X	X	X
Home computer for child's use (yes/no)		X	X	X	X
Family receive newspapers or magazines (yes/no)				X	
Regular tutoring (yes/no)			X	X	X

\*Family income is measured with a continuous variable in kindergarten, and with categorical variable in first, third, and fifth grades.

\*\* In kindergarten and first grade parents are asked if their children have ever participated in these activities; in third and fifth grade parents are asked if their children have participated in the past year

**Table 3: Mean Annualized Enrichment Expenditures, Families with Children, Consumer Expenditure Survey 1997-2006**

	Total enrichment expenditure (% of total expenditure)						College tuition & books Per adult	Per child				School supplies & books	
	N	Books & magazines	Equivalized			Recreation & activities		Entertainment	Non-college tuition & private bus	Child care			
			Computer	Sport	Trips						Electronics		
Full sample	83094	2871 (8)	59	271	330	713	277	200	114	47	254	539	66
Quintile 1	16616	430 (3)	9	55	85	70	78	16	9	9	19	64	16
Quintile 2	16622	1134 (5)	26	139	179	214	163	57	35	21	68	201	32
Quintile 3	16618	2055 (7)	44	226	281	440	249	112	75	37	131	410	51
Quintile 4	16622	3527 (9)	78	361	407	845	348	204	148	60	246	753	78
Quintile 5	16616	7207 (9)	138	572	700	1998	546	614	303	110	806	1266	154
Mother's race/ethnicity:													
Whites	55378	3423 (8)	74	319	409	876	319	231	148	58	295	615	78
Black	9850	1525 (6)	25	146	157	253	162	148	32	24	137	401	40
Hispanic	12697	1460 (6)	21	144	150	338	185	77	37	26	143	304	35
Other	5169	2985 (8)	54	299	252	769	272	274	102	33	303	557	68
Mother's education:													
< HS	10772	856 (4)	12	94	128	205	144	31	15	15	40	149	23
HS	22880	1747 (6)	30	195	244	402	218	92	53	31	133	306	43
Some college	26388	2773 (8)	54	286	338	660	291	217	101	47	215	496	67
BA plus	23054	5039 (10)	116	410	501	1321	381	368	236	79	518	1001	108
Family type:													
Single-mother	15084	1805 (7)	40	173	197	350	201	152	65	34	134	406	54
Two-parent	68010	3107 (8)	63	292	360	794	294	211	125	50	280	568	69
Child's age:													
Preschool only	18035	3231 (9)	55	235	346	576	280	124	69	34	48	1438	25
School-age only	26061	3135 (8)	72	334	333	897	303	271	148	63	375	240	99
Preschool & school-age	38998	2528 (8)	52	245	321	655	258	186	112	43	268	323	63

Notes: The samples are restricted to families with children under 18 and respondents aged 18-54. Quintiles are based on an expenditure-to-needs ratio using total expenditure and poverty thresholds. Poverty thresholds are based on U.S. Census data. All expenditures are in 2003 dollars using the Personal Consumption Expenditures: Chain-Type Price Index, produced by the Bureau of Economic Analysis and hosted by the St. Louis Federal Reserve Bank ([www.stlouisfed.org](http://www.stlouisfed.org)). Expenditures on books and magazines, computers, sport, out of town trips were equivalized as described in the text. Expenditure on college tuition and books is per adult and all other items are per child.



**Table 4: Association between Annualized Total Family Budget and Expenditures on Enrichment Items: Cross-Sectional Analysis**

	Total enrichment expenditure	Books & magazines	Computer	Sport	Trips	Electronics	College tuition & books	Recreation & activities	Entertainment	Non- college tuition & private bus	Child care	School supplies & books
Full sample	91.01*** (2.62) [1.14]	1.27*** (.07) [0.78]	5.48*** (.24) [0.73]	2.96*** (.28) [1.06]	27.09*** (1.18) [1.37]	6.36*** (.55) [0.83]	9.85*** (.9) [1.78]	3.97*** (0.24) [1.26]	1.31*** (0.12) [1]	13.40*** (1.02) [1.9]	11.00*** (0.56) [0.74]	1.62*** (.142) [0.88]
Quintile 1	58.41*** (1.95) [1.78]	0.88*** (.09) [1.29]	7.10*** (.64) [1.69]	8.93*** (.51) [1.38]	13.25*** (.995) [2.48]	9.02*** (.512) [1.52]	2.94*** (0.43) [2.41]	1.37*** (0.10) [1.99]	1.01*** (0.06) [1.48]	3.35*** (0.71) [2.31]	8.94*** (0.87) [1.83]	1.62*** (.202) [1.33]
Quintile 2	100.11*** (4.89) [1.9]	1.94*** (.30) [1.61]	11.03*** (1.56) [1.71]	11.62*** (1.29) [1.4]	19.24*** (3.10) [1.93]	12.28*** (1.12) [1.62]	6.72*** (1.44) [2.54]	3.53*** (0.35) [2.17]	1.71*** (.153) [1.75]	7.93*** (1.93) [2.51]	22.66*** (2.05) [2.42]	1.46 (0.44) [0.98]
Quintile 3	127.67*** (6.39) [1.82]	1.92*** (0.32) [1.28]	11.58*** (1.98) [1.51]	12.01*** (1.80) [1.26]	36.96*** (3.63) [2.47]	10.60*** (1.21) [1.25]	8.26*** (1.97) [2.16]	4.68*** (0.51) [1.83]	2.021*** (0.205) [1.61]	9.31*** (3.06) [2.09]	27.50*** (2.76) [1.97]	2.83*** (0.72) [1.63]
Quintile 4	141.91*** (6.44) [1.62]	1.87*** (0.28) [0.96]	10.20*** (1.67) [1.14]	10.54*** (1.570) [1.04]	43.82*** (3.42) [2.09]	9.91*** (1.21) [1.15]	11.26*** (2.34) [2.23]	6.00*** (.54) [1.63]	1.933*** (.236) [1.31]	17.33*** (3.03) [2.84]	26.07*** (2.78) [1.4]	3.02*** (0.68) [1.56]
Quintile 5	76.19*** (5.47) [0.8]	0.77*** (0.12) [0.42]	2.57*** (0.43) [0.34]	9.17*** (3.15) [1]	21.98*** (2.63) [0.84]	5.01*** (1.04) [0.7]	11.48*** (1.80) [1.42]	3.68*** (0.53) [0.92]	1.145*** (.265) [0.79]	14.79*** (2.04) [1.39]	4.26*** (0.93) [0.26]	1.36*** (0.28) [0.67]
Mother's Education												
< HS	51.10*** (3.43) [1.21]	0.56*** (.07) [0.93]	6.61*** (1.05) [1.43]	5.36*** (.92) [0.85]	15.55*** (1.48) [1.54]	6.11*** (0.57) [0.86]	3.73*** (1.13) [2.45]	1.23*** (0.17) [1.67]	0.866*** (.144) [1.17]	4.22*** (1.40) [2.14]	6.17*** (.90) [0.84]	0.73*** (.23) [0.65]
HS	62.36*** (2.86) [1.04]	0.81*** (.07) [0.79]	5.03*** (0.38) [0.75]	6.89*** (.62) [0.82]	18.39*** (1.14) [1.33]	5.59*** (0.32) [0.74]	5.71*** (0.88) [1.80]	2.21*** (0.26) [1.21]	0.858*** (.057) [0.8]	7.98*** (1.16) [1.74]	7.88*** (0.92) [0.75]	1.03*** (0.12) [0.69]
Some college	79.00*** (3.91) [1.03]	1.09*** (.10) [0.73]	5.45*** (0.37) [0.69]	7.5*** (.62) [0.81]	23.86*** (1.41) [1.31]	7.31*** (1.61) [0.91]	9.62*** (1.86) [1.61]	2.91*** (0.20) [1.05]	1.057*** (.078) [0.82]	9.54*** (1.35) [1.61]	9.181*** (0.79) [0.67]	1.48*** (.23) [0.8]
BA plus	112.78*** (4.81) [1.12]	1.57*** (0.13) [0.68]	5.51*** (0.41) [0.67]	12.72*** (3.23) [1.27]	33.20*** (2.25) [1.26]	6.01*** (0.48) [0.79]	11.91*** (1.38) [1.62]	5.48*** (0.47) [1.16]	1.663*** (.25) [1.05]	18.45*** (1.92) [1.78]	14.32*** (1.08) [0.72]	1.94*** (0.25) [0.9]
Child's Age												
Preschool	81.70***	1.08***	4.44***	7.51***	19.90***	6.43***	3.80***	2.22***	0.731***	1.78***	33.11***	0.68***

only	(3.11) [0.92]	(0.081) [0.71]	(0.39) [0.68]	(0.68) [0.79]	(1.90) [1.25]	(0.64) [0.83]	(0.79) [1.11]	(0.18) [1.17]	(.065) [0.78]	(0.42) [1.35]	(1.87) [0.83]	(0.25) [0.98]
School-age only	100.38*** (4.23) [1.28]	1.62*** (0.10) [0.9]	6.64*** (.42) [0.80]	8.51*** (1.31) [1.02]	32.41*** (2.31) [1.45]	5.69*** (0.44) [0.75]	15.52*** (1.57) [2.29]	4.71*** (0.37) [1.27]	1.86*** (0.27) [1.18]	16.61*** (1.67) [1.77]	4.27** (0.58) [0.71]	2.55*** (.28) [1.03]
Preschool & school-age	97.45*** (4.30) [1.29]	1.51*** (0.13) [0.97]	5.70*** (0.33) [0.78]	12.35*** (3.23) [1.28]	28.2*** (1.36) [1.44]	7.16*** (1.11) [0.93]	8.29*** (1.14) [1.49]	4.97*** (0.43) [1.48]	1.26*** (.093) [0.98]	17.19*** (1.73) [2.14]	9.37*** (0.63) [0.97]	1.47*** (0.16) [0.78]

Notes: Each coefficient represents a separate regression of an enrichment item on total expenditure controlling for maternal age, education, and race, number of family members less than 18, number of other adults in the family and number of persons over 64, urbanicity, month effects, and year effects. Standard errors, clustered on consumer units, are in parentheses, and expenditure elasticities are in brackets.

**Table 5: Association between Annualized Total Family Budget and Expenditures on Enrichment: Longitudinal Analysis**

	Fixed Effects Model
Full sample	59.38*** (0.83) [0.75]
Quintile 1	75.88*** (2.68) [2.31]
Quintile 2	134.0*** (5.60) [2.54]
Quintile 3	177.54*** (7.17) [2.54]
Quintile 4	210.41*** (6.91) [2.41]
Quintile 5	64.25*** (2.60) [0.68]
Mother's Education < HS	25.64*** (1.50) [0.61]
HS	31.38*** (1.23) [0.52]
Some college	43.60*** (1.33) [0.57]
BA plus	87.79*** (1.82) [0.87]
Child's Age Preschool only	36.536*** (1.546) [0.41]
School-age only	61.941*** (1.579) [0.79]
Preschool & school-age	63.249*** (1.238) [0.83]

Notes: Each coefficient represents a separate regression of expenditure on items of enrichment on total expenditure controlling for maternal age, education, and race, number of family members less than 18, number of other adults in the family and number of persons over 64, urbanicity, month and year effects. Standard errors, clustered on consumer units, are in parentheses, and expenditure elasticities are in brackets.

Table 6. Descriptive statistics for Kindergarten and 5th grade Outcomes, and Family Investments

Kindergarten Outcomes and Family Investments		Full Sample		Q1		Q2		Q3		Q4		Q5	
		Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Reading KS		50.39	.07	45.51	.16	47.65	.18	50.32	.14	52.46	.14	54.96	.15
Math KS		50.57	.07	45.21	.15	47.41	.18	50.50	.14	52.96	.14	55.53	.14
Externalizing KS		-.01	.01	.19	.02	.07	.02	.01	.02	-.10	.01	-.14	.01
Internalizing KS		-.01	.01	.16	.02	.07	.02	.02	.02	-.11	.02	-.15	.01
Preschool		.76	.00	.71	.01	.70	.01	.72	.01	.79	.01	.87	.01
Drama Lessons		.02	.00	.01	.00	.01	.00	.01	.00	.02	.00	.03	.00
Craft Lessons		.10	.00	.06	.00	.07	.00	.11	.00	.11	.01	.17	.01
Foreign Language Instruction		.06	.00	.05	.00	.05	.00	.06	.00	.06	.00	.09	.00
Number of Audio CDs		15.04	.14	9.00	.24	10.89	.27	14.78	.26	17.80	.32	21.21	.31
Private School		.23	.00	.06	.00	.11	.01	.19	.01	.30	.01	.42	.01
Music Lessons		.08	.00	.04	.00	.05	.00	.07	.00	.08	.00	.15	.01
Dance Lessons		.17	.00	.08	.00	.09	.01	.14	.01	.22	.01	.30	.01
Participate in Organized Athletics		.45	.00	.21	.01	.28	.01	.42	.01	.57	.01	.70	.01
Participate in Organized Clubs		.13	.00	.08	.00	.09	.01	.12	.01	.16	.01	.19	.01
Art Lessons		.07	.00	.05	.00	.05	.00	.06	.00	.07	.00	.13	.01
Participate in Performing Arts		.14	.00	.10	.01	.10	.01	.13	.01	.16	.01	.19	.01
Number of Children's Books		72.85	.43	40.47	.73	52.74	.99	72.58	.87	87.26	.96	103.63	.95
Home Computer for Child's Use		.54	.00	.22	.01	.36	.01	.52	.01	.69	.01	.85	.01
Sample Size		19805		3850		3153		4433		4127		4242	

Table 6. Continued

5th Grade Outcomes and Investments	Full Sample		Q1		Q2		Q3		Q4		Q5	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Reading 5S	51.21	.09	45.17	.21	47.63	.23	50.97	.18	53.30	.18	56.18	.17
Math 5S	51.25	.09	45.51	.22	48.06	.24	50.90	.18	53.06	.17	56.15	.17
Externalizing 5S	.00	.01	.21	.02	.12	.02	.02	.02	-.10	.02	-.18	.02
Internalizing 5S	.00	.01	.13	.03	.09	.03	.04	.02	-.07	.02	-.15	.02
Preschool	.76	.00	.69	.01	.67	.01	.71	.01	.79	.01	.87	.01
Drama Lessons-Kindergarten	.02	.00	.01	.00	.01	.00	.01	.00	.01	.00	.03	.00
Craft Lessons- Kindergarten	.11	.00	.06	.01	.06	.01	.10	.01	.11	.01	.18	.01
Foreign Language Instruction-Kindergarten	.06	.00	.05	.01	.06	.01	.05	.00	.06	.00	.09	.01
Number of Audio CDs- Kindergarten	15.40	.17	9.09	.36	10.54	.40	14.67	.34	17.87	.39	21.50	.39
K-5: Attend Private School	.80	.01	.18	.02	.34	.03	.67	.03	1.06	.04	1.41	.04
K-5: Participate in Music Lessons	.69	.01	.38	.02	.47	.02	.57	.02	.73	.02	1.14	.02
K-5: Participate in Dance Lessons	.66	.01	.44	.02	.45	.02	.50	.02	.77	.02	.99	.03
K-5: Participate in Organized Athletics	2.30	.01	1.35	.03	1.59	.04	2.17	.03	2.75	.03	3.16	.02
K-5: Participate in Organized Clubs	1.07	.01	.62	.02	.70	.03	1.03	.02	1.26	.03	1.49	.03
K-5: Art Lessons	.42	.01	.32	.02	.33	.02	.35	.01	.38	.02	.63	.02
K-5: Participate in Performing Arts	.82	.01	.63	.02	.66	.03	.74	.02	.90	.02	1.05	.02
K-5: Average number of books	100.94	1.03	54.73	1.64	69.72	2.08	101.82	2.32	115.23	2.16	140.44	2.48
K-5: Computer	2.87	.01	1.66	.03	2.22	.03	2.89	.03	3.35	.02	3.72	.01
K-5: Tutor	.25	.01	.32	.01	.30	.02	.24	.01	.22	.01	.21	.01
Received Magazine-Grade 3	.75	.00	.52	.01	.62	.01	.74	.01	.84	.01	.93	.01
Received Newspaper-Grade 3	.62	.00	.45	.01	.49	.01	.58	.01	.68	.01	.82	.01
N	10985		1902		1613		2448		2453		2569	

Table 7: Summary of Regressions of Kindergarten Spring Reading, Math, Externalizing Behavior, and Internalizing Behavior on Income Quintiles, Family Investments, and Covariates

	Reading					Math				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
<i>Family Income (Quintile 1 is reference group)</i>										
Income Quintile 2	2.14***	0.99***	0.77**	0.21	0.09	2.20***	0.95***	0.72**	0.19	0.07
	(0.26)	(0.25)	(0.25)	(0.19)	(0.19)	(0.23)	(0.23)	(0.23)	(0.15)	(0.15)
Income Quintile 3	4.84***	2.03***	1.47***	0.37*	0.17	5.32***	2.18***	1.55***	0.43**	0.23
	(0.25)	(0.25)	(0.24)	(0.18)	(0.17)	(0.23)	(0.23)	(0.23)	(0.15)	(0.15)
Income Quintile 4	6.97***	2.56***	1.61***	0.18	-0.04	7.77***	2.98***	1.92***	0.39*	0.15
	(0.26)	(0.26)	(0.26)	(0.19)	(0.20)	(0.25)	(0.25)	(0.26)	(0.18)	(0.18)
Income Quintile 5	9.47***	3.07***	1.74***	0.00	-0.22	10.35***	3.56***	2.05***	0.13	-0.10
	(0.31)	(0.30)	(0.30)	(0.21)	(0.21)	(0.28)	(0.28)	(0.29)	(0.20)	(0.20)
<i>Family Investments</i>										
Preschool			0.51**	-0.36**	-0.34**			0.80***	-0.01	-0.03
			(0.18)	(0.12)	(0.12)			(0.17)	(0.12)	(0.12)
Drama Lessons			0.72	-0.04	0.03			0.72	0.09	0.15
			(0.62)	(0.44)	(0.43)			(0.68)	(0.51)	(0.49)
Craft Lessons			-0.26	-0.22	-0.17			0.33	0.01	0.04
			(0.23)	(0.18)	(0.18)			(0.24)	(0.17)	(0.17)
Foreign Language Instruction			0.54+	0.07	0.07			0.38	0.09	0.10
			(0.32)	(0.23)	(0.24)			(0.29)	(0.18)	(0.18)
Number of Audio CDs			0.01	-0.00	-0.00			0.01+	-0.00	-0.00
			(0.00)	(0.00)	(0.00)			(0.00)	(0.00)	(0.00)
Private School			1.27***	0.07	0.11			1.08***	-0.08	0.02
			(0.31)	(0.20)	(0.24)			(0.28)	(0.17)	(0.20)
Music Lessons			1.75***	0.28	0.21			1.38***	0.10	0.07
			(0.27)	(0.19)	(0.19)			(0.26)	(0.19)	(0.18)
Dance Lessons			0.07	-0.50***	-0.50***			-0.06	-0.24+	-0.20
			(0.23)	(0.14)	(0.14)			(0.20)	(0.13)	(0.13)
Participate in Organized Athletics			1.09***	0.34**	0.30**			1.46***	0.28*	0.22+
			(0.17)	(0.11)	(0.11)			(0.16)	(0.11)	(0.11)
Participate in Organized Clubs			0.24	-0.04	-0.01			0.66**	0.19	0.19
			(0.23)	(0.15)	(0.15)			(0.22)	(0.13)	(0.13)
Art Lessons			-0.37	-0.47*	-0.45*			-0.22	-0.30+	-0.26
			(0.29)	(0.22)	(0.21)			(0.29)	(0.18)	(0.18)
Participate in Performing Arts			0.61**	0.33*	0.18			0.45*	0.35*	0.23
			(0.22)	(0.15)	(0.15)			(0.21)	(0.16)	(0.15)
Number of Children's Books			0.01***	-0.00	0.00			0.01***	0.00	0.00
			(0.00)	(0.00)	(0.00)			(0.00)	(0.00)	(0.00)
Home Computer for Child's Use			1.43***	0.47***	0.42***			1.58***	0.46***	0.42***
			(0.15)	(0.10)	(0.10)			(0.16)	(0.10)	(0.10)
Demographic Controls		X	X	X	X		X	X	X	X
Lagged Dependent Variable				X	X				X	X
Extended Controls					X					X
Observations	19805	19805	19805	19805	19805	19805	19805	19805	19805	19805
R-squared	0.11	0.20	0.22	0.63	0.64	0.14	0.23	0.25	0.68	0.69

Table 7: Continued

	Externalizing Behavior					Internalizing Behavior				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
<i>Family Income (Quintile 1 is reference group)</i>										
Income Quintile 2	-0.12*** (0.03)	-0.05+ (0.03)	-0.04 (0.03)	-0.04* (0.02)	-0.04+ (0.02)	-0.09*** (0.03)	-0.05+ (0.03)	-0.05+ (0.03)	-0.04+ (0.02)	-0.03 (0.02)
Income Quintile 3	-0.18*** (0.03)	-0.06* (0.03)	-0.05* (0.03)	-0.04* (0.02)	-0.02 (0.02)	-0.14*** (0.03)	-0.06* (0.03)	-0.05+ (0.03)	-0.04 (0.02)	-0.00 (0.02)
Income Quintile 4	-0.29*** (0.03)	-0.11*** (0.03)	-0.11*** (0.03)	-0.06** (0.02)	-0.03 (0.02)	-0.27*** (0.03)	-0.15*** (0.03)	-0.12*** (0.03)	-0.08** (0.03)	-0.03 (0.03)
Income Quintile 5	-0.34*** (0.03)	-0.11*** (0.03)	-0.11*** (0.03)	-0.06** (0.02)	-0.04 (0.03)	-0.31*** (0.03)	-0.15*** (0.03)	-0.11*** (0.03)	-0.07* (0.03)	-0.03 (0.03)
<i>Family Investments</i>										
Preschool			0.21*** (0.02)	0.07*** (0.01)	0.06*** (0.01)			0.01 (0.02)	0.02 (0.02)	0.01 (0.02)
Drama Lessons			0.07 (0.06)	-0.05 (0.04)	-0.05 (0.04)			-0.07 (0.06)	-0.02 (0.05)	-0.04 (0.05)
Craft Lessons			0.02 (0.03)	0.02 (0.02)	0.02 (0.02)			-0.01 (0.03)	-0.00 (0.02)	0.00 (0.02)
Foreign Language Instruction			0.06+ (0.03)	0.04 (0.03)	0.04 (0.03)			0.05 (0.03)	0.03 (0.03)	0.04 (0.03)
Number of Audio CDs			0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)			-0.00* (0.00)	-0.00** (0.00)	-0.00* (0.00)
Private School			0.08** (0.03)	0.02 (0.02)	0.04 (0.02)			0.01 (0.03)	-0.00 (0.03)	0.04 (0.03)
Music Lessons			0.00 (0.03)	-0.02 (0.02)	-0.01 (0.02)			0.02 (0.03)	-0.00 (0.03)	0.01 (0.03)
Dance Lessons			0.02 (0.02)	0.01 (0.02)	0.01 (0.02)			-0.06** (0.02)	-0.05* (0.02)	-0.04* (0.02)
Participate in Organized Athletics			-0.03+ (0.02)	-0.02+ (0.01)	-0.02 (0.01)			-0.11*** (0.02)	-0.05*** (0.01)	-0.04** (0.01)
Participate in Organized Clubs			0.02 (0.02)	0.00 (0.02)	0.01 (0.02)			-0.01 (0.02)	-0.01 (0.02)	-0.00 (0.02)
Art Lessons			-0.01 (0.03)	-0.00 (0.02)	-0.00 (0.02)			0.05+ (0.03)	0.03 (0.03)	0.03 (0.03)
Participate in Performing Arts			0.02 (0.02)	-0.00 (0.02)	0.00 (0.02)			-0.04+ (0.03)	0.01 (0.02)	0.01 (0.02)
Number of Children's Books			-0.00+ (0.00)	0.00 (0.00)	0.00 (0.00)			0.00** (0.00)	0.00*** (0.00)	0.00*** (0.00)
Home Computer for Child's Use			-0.06*** (0.02)	-0.02+ (0.01)	-0.01 (0.01)			-0.01 (0.02)	0.01 (0.02)	0.02 (0.02)
Demographic Controls		X	X	X	X		X	X	X	X
Lagged Dependent Variable				X	X				X	X
Extended Controls					X					X
Observations	19805	19805	19805	19805	19805	19805	19805	19805	19805	19805
R-squared	0.01	0.09	0.10	0.52	0.53	0.01	0.02	0.03	0.30	0.31

Note. Robust standard errors in parentheses. See appendix table 5 for more detail about independent variables.

\*\*\* p<0.001, \*\* p<0.01, \* p<0.05, + p<0.1

Table 8: Summary of Regressions of Fifth Grade Spring Reading, Math, Externalizing Behavior, and Internalizing Behavior on Income Quintiles, Family Investments, and Covariates

	Reading					Math				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
<i>Family Income (Quintile 1 is reference group)</i>										
Income Quintile 2	2.43*** (0.32)	0.31 (0.31)	0.61* (0.29)	0.40 (0.27)	0.23 (0.27)	2.51*** (0.33)	0.98** (0.31)	0.60* (0.30)	0.39 (0.26)	0.35 (0.25)
Income Quintile 3	5.79*** (0.32)	1.00*** (0.27)	1.07*** (0.29)	0.70** (0.27)	0.41 (0.27)	5.36*** (0.34)	1.81*** (0.33)	0.88** (0.32)	0.52+ (0.27)	0.51+ (0.27)
Income Quintile 4	8.11*** (0.33)	1.31*** (0.29)	1.20*** (0.32)	0.66* (0.29)	0.31 (0.30)	7.52*** (0.34)	2.20*** (0.34)	1.01** (0.34)	0.38 (0.30)	0.34 (0.29)
Income Quintile 5	10.99*** (0.36)	1.79*** (0.30)	1.37*** (0.35)	0.56+ (0.32)	0.21 (0.33)	10.60*** (0.37)	3.05*** (0.36)	1.53*** (0.36)	0.60+ (0.31)	0.52+ (0.31)
<i>Family Investments</i>										
Preschool			0.25 (0.19)	-0.20 (0.18)	-0.24 (0.18)			0.27 (0.20)	-0.28 (0.17)	-0.28 (0.17)
Drama Lessons-Kindergarten			0.88 (0.65)	0.34 (0.58)	0.37 (0.57)			-0.00 (0.70)	-0.74 (0.64)	-0.81 (0.63)
Craft Lessons- Kindergarten			0.38 (0.28)	0.27 (0.26)	0.28 (0.26)			0.47+ (0.25)	0.15 (0.23)	0.31 (0.22)
Foreign Language Instruction			0.18 (0.37)	-0.05 (0.33)	-0.01 (0.33)			0.75* (0.35)	0.45 (0.29)	0.41 (0.29)
Number of Audio CDs- Kindergarten			-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)			0.01 (0.01)	0.00 (0.00)	0.00 (0.00)
K-5: Attend Private School			0.27*** (0.06)	0.13* (0.06)	0.12+ (0.06)			-0.26*** (0.07)	-0.47*** (0.06)	-0.45*** (0.07)
K-5: Participate in Music Lessons			0.82*** (0.10)	0.46*** (0.09)	0.46*** (0.09)			0.68*** (0.09)	0.25*** (0.08)	0.23** (0.08)
K-5: Participate in Dance Lessons			-0.09 (0.09)	-0.11 (0.08)	-0.08 (0.08)			-0.13 (0.09)	-0.05 (0.08)	-0.07 (0.08)
K-5: Participate in Organized Athletics			0.09 (0.07)	-0.03 (0.06)	-0.08 (0.06)			0.33*** (0.07)	-0.03 (0.07)	0.02 (0.07)
K-5: Participate in Organized Clubs			0.19** (0.07)	0.19** (0.07)	0.14* (0.07)			0.18* (0.07)	0.14* (0.06)	0.16* (0.06)
K-5: Art Lessons			0.06 (0.11)	0.00 (0.10)	-0.02 (0.10)			0.11 (0.12)	0.06 (0.10)	-0.02 (0.10)
K-5: Participate in Performing Arts			0.09 (0.09)	0.07 (0.08)	0.06 (0.08)			-0.03 (0.09)	-0.02 (0.08)	0.01 (0.08)
K-5: Average number of books			0.01*** (0.00)	0.00*** (0.00)	0.00*** (0.00)			0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)
K-5: Computer			0.84*** (0.08)	0.58*** (0.07)	0.47*** (0.07)			0.91*** (0.08)	0.46*** (0.07)	0.41*** (0.07)
K-5: Tutor			-4.28*** (0.16)	-3.04*** (0.16)	-3.01*** (0.16)			-3.90*** (0.17)	-1.94*** (0.15)	-1.92*** (0.15)
Received Magazine-Grade 3			0.57* (0.22)	0.53* (0.21)	0.48* (0.22)			0.41 (0.25)	0.26 (0.21)	0.36+ (0.21)
Received Newspaper-Grade 3			0.08 (0.16)	0.03 (0.16)	0.09 (0.16)			0.16 (0.18)	0.02 (0.16)	0.11 (0.16)
Basic Controls		X	X	X	X		X	X	X	X
Lagged Dependent Variable				X	X				X	X
Extended Controls					X					X
Observations	10985	19805	10985	10985	10985	10985	10985	10985	10985	10985
R-squared	0.16	0.10	0.36	0.46	0.47	0.15	0.26	0.33	0.52	0.54



Table 8: Continued

	Externalizing Behavior					Internalizing Behavior				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
<i>Family Income (Quintile 1 is reference group)</i>										
Income Quintile 2	-0.06+	0.02	0.04	0.04	0.04	-0.02	0.00	0.02	0.02	0.00
	(0.04)	(0.03)	(0.04)	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Income Quintile 3	-0.16***	-0.01	0.03	0.02	0.03	-0.09**	-0.05	-0.01	-0.01	-0.02
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.03)	(0.04)	(0.04)	(0.04)	(0.04)
Income Quintile 4	-0.31***	-0.08*	-0.05	-0.04	-0.00	-0.22***	-0.15***	-0.07+	-0.07+	-0.05
	(0.03)	(0.04)	(0.04)	(0.04)	(0.04)	(0.03)	(0.04)	(0.04)	(0.04)	(0.04)
Income Quintile 5	-0.39***	-0.09*	-0.05	-0.04	-0.00	-0.31***	-0.21***	-0.12**	-0.11*	-0.10*
	(0.03)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.05)
<i>Family Investments</i>										
Preschool			0.12***	0.06**	0.04*			0.04+	0.05*	0.03
			(0.02)	(0.02)	(0.02)			(0.02)	(0.02)	(0.02)
Drama Lessons-Kindergarten			0.07	0.02	0.03			-0.07	-0.07	-0.07
			(0.08)	(0.07)	(0.07)			(0.08)	(0.08)	(0.08)
Craft Lessons- Kindergarten			0.07*	0.07**	0.06*			0.06+	0.07*	0.07+
			(0.03)	(0.03)	(0.03)			(0.03)	(0.03)	(0.03)
Foreign Language Instruction			0.06	0.05	0.04			-0.01	-0.01	-0.01
			(0.04)	(0.04)	(0.04)			(0.05)	(0.05)	(0.04)
Number of Audio CDs- Kindergarten			-0.00	0.00	0.00			-0.00	-0.00	-0.00
			(0.00)	(0.00)	(0.00)			(0.00)	(0.00)	(0.00)
K-5: Attend Private School			0.00	-0.00	-0.01			0.00	-0.00	-0.01
			(0.01)	(0.01)	(0.01)			(0.01)	(0.01)	(0.01)
K-5: Participate in Music Lessons			-0.02+	-0.01	-0.01			-0.02+	-0.02+	-0.01
			(0.01)	(0.01)	(0.01)			(0.01)	(0.01)	(0.01)
K-5: Participate in Dance Lessons			-0.00	-0.00	0.00			-0.02*	-0.02*	-0.02+
			(0.01)	(0.01)	(0.01)			(0.01)	(0.01)	(0.01)
K-5: Participate in Organized Athletics			-0.00	-0.00	-0.00			-0.08***	-0.07***	-0.07***
			(0.01)	(0.01)	(0.01)			(0.01)	(0.01)	(0.01)
K-5: Participate in Organized Clubs			0.01+	0.02+	0.01			0.03**	0.03**	0.02**
			(0.01)	(0.01)	(0.01)			(0.01)	(0.01)	(0.01)
K-5: Art Lessons			0.00	-0.00	0.00			0.04**	0.03*	0.04*
			(0.01)	(0.01)	(0.01)			(0.01)	(0.02)	(0.01)
K-5: Participate in Performing Arts			0.02*	0.01	0.01			0.00	0.01	0.01
			(0.01)	(0.01)	(0.01)			(0.01)	(0.01)	(0.01)
K-5: Average number of books			-0.00	-0.00	-0.00			0.00	0.00	0.00
			(0.00)	(0.00)	(0.00)			(0.00)	(0.00)	(0.00)
K-5: Computer			-0.04***	-0.03***	-0.03**			-0.02	-0.01	-0.01
			(0.01)	(0.01)	(0.01)			(0.01)	(0.01)	(0.01)
K-5: Tutor			0.09***	0.05**	0.04*			0.19***	0.17***	0.17***
			(0.02)	(0.02)	(0.02)			(0.02)	(0.02)	(0.02)
Received Magazine-Grade 3			0.03	0.03	0.03			0.02	0.03	0.03
			(0.03)	(0.02)	(0.02)			(0.03)	(0.03)	(0.03)
Received Newspaper-Grade 3			-0.03	-0.03	-0.02			-0.07**	-0.07**	-0.07*
			(0.02)	(0.02)	(0.02)			(0.03)	(0.03)	(0.03)
Basic Controls		X	X	X	X		X	X	X	X
Lagged Dependent Variable				X	X				X	X
Extended Controls					X					X
Observations	10985	10985	10985	10985	10985	10985	10985	10985	10985	10985
R-squared	0.02	0.11	0.12	0.23	0.24	0.01	0.03	0.05	0.08	0.10

Note. Robust standard errors in parentheses. See appendix table 5 for more detail about independent variables.

\*\*\* p<0.001, \*\* p<0.01, \* p<0.05, + p<0.1



Preschool only	18035	36201	13770 (38)	4625 (13)	1401 (4)	7254 (20)	373 (1)	1332 (4)	1676 (5)	227 (1)	544 (2)	4240 (12)	356 (1)	415 (1)
School-age only	26061	40026	12976 (32)	5654 (14)	1811 (5)	7932 (20)	1074 (3)	1484 (4)	2320 (6)	293 (1)	795 (2)	4705 (12)	462 (1)	533 (1)
Preschool & school-age	38998	33355	11045 (33)	4968 (15)	1388 (4)	6640 (20)	860 (3)	1312 (4)	1858 (6)	227 (1)	643 (2)	3673 (11)	367 (1)	380 (1)

Notes. Quintiles are based on an expenditure-to-needs ratio using total expenditure and poverty thresholds. Poverty thresholds are based on U.S. Census data. All expenditures are in 2003 dollars using the Personal Consumption Expenditures: Chain-Type Price Index, produced by the Bureau of Economic Analysis and hosted by the St. Louis Federal Reserve Bank ([www.stlouisfed.org](http://www.stlouisfed.org)). Expenditures are equivalized as described in the text.

**Appendix Table 2: Family Income and Total Expenditures, 1997-2006**

	Number of observations	Annual family income	Quarterly total expenditure	Annualized total expenditure	Annualized expenditure as % of income
Full Sample	65445	60985	9216	36864	60
Quintile 1	13075	15277	4640	18559	121
Quintile 2	13095	33776	6421	25683	76
Quintile 3	13057	51567	8528	34111	66
Quintile 4	13097	72476	10754	43016	59
Quintile 5	13121	131589	15715	62861	48
Mother's race/ethnicity:					
NH Whites	43388	69567	10378	41510	60
NH Black	7515	38738	6621	26485	68
Hispanic	10512	40192	6363	25453	63
Other	4030	64306	8990	35959	56
Mother's Education:					
< HS	8713	31032	5138	20554	66
HS	17785	47006	7468	29872	64
Some college	21136	59085	9298	37191	63
BA+	17811	91850	12859	51436	56
Family Type:					
Single-mother headed household	12370	25898	6845	27379	106
Two-parent headed household	53075	69162	9769	39075	56
Age of Children:					
Preschool only	14540	56974	9229	36915	65
School-age only	20444	62427	10248	40990	66
Both preschool & school-age	30461	61931	8517	34070	55

Notes: Income and expenditures are in 2003 dollars. Quintiles are based on family income to needs ratio. Sample is restricted to families with children under 18, respondents aged 18-54 and families with non-missing data on family income

**Appendix Table 3: Association between Annualized Family Income and Expenditures on Enrichment Items: Cross-Sectional Analysis**

	Total enrichment expenditure	Books & magazines	Computer	Sport	Trips	Electronics	College tuition & books	Recreation & activities	Entertainment	Non-college tuition & private bus	Child care	School supplies & books
Full sample	32.716*** (1.057) [0.7]	0.525*** (.034) [0.52]	1.87*** (.139) [0.41]	2.966*** (.278) [0.53]	9.833*** (.435) [0.84]	1.955*** (.223) [0.41]	1.6*** (.275) [0.5]	1.885*** (.119) [0.99]	.506*** (.036) [0.65]	5.363*** (.621) [1.37]	5.801*** (.386) [0.63]	.412*** (.059) [0.38]
Quintile 1	3.762 (3.166) [0.07]	-0.138 (.14) [-0.11]	-0.837 (.73) [-0.13]	1.82*** (.686) [0.2]	-2.644* (1.416) [-0.23]	2.464*** (.48) [0.27]	-1.194 (1.274) [-0.21]	-0.157 (.253) [-0.1]	-0.043 (.096) [-0.04]	-0.824 (.945) [-0.23]	3.602*** (.913) [0.34]	-0.04 (.18) [-0.02]
Quintile 2	27.824*** (4.314) [0.63]	.281 (.210) [0.29]	3.695*** (.985) [0.76]	4.942*** (1.048) [0.75]	2.522 (1.819) [0.27]	4.676*** (.817) [0.75]	1.306 (1.111) [0.48]	1.395*** (.249) [1.11]	0.612*** (.111) [0.8]	-1.223 (1.902) [-0.53]	9.302*** (1.666) [1.11]	0.316 (0.281) [0.29]
Quintile 3	33.685*** (4.877) [0.74]	0.414** (0.198) [0.41]	2.185* (1.201) [0.43]	2.289* (1.3) [0.36]	9.932*** (2.373) [0.93]	2.737*** (.739) [0.52]	1.651 (1.256) [0.64]	1.92*** (.326) [1.19]	0.704*** (.146) [0.91]	1.864 (1.587) [0.71]	9.339*** (2.002) [1.09]	0.649* (0.348) [0.57]
Quintile 4	32.015*** (5.302) [0.67]	0.568*** (0.202) [0.58]	2.899** (1.157) [0.6]	3.402*** (1.225) [0.6]	9.308*** (2.585) [0.82]	2.965*** (.85) [0.61]	-0.525 (1.751) [0.64]	1.626*** (.366) [0.89]	0.45*** (.152) [0.57]	-0.534 (2.21) [-0.11]	11.196*** (2.14) [1.15]	0.662* (.418) [0.59]
Quintile 5	30.21*** (2.009) [0.64]	0.41*** (.061) [0.41]	1.238*** (.262) [0.32]	2.739*** (.482) [0.6]	9.51*** (.821) [0.75]	1.281*** (.328) [0.35]	1.358*** (.478) [-0.15]	1.952*** (.235) [0.88]	0.426*** (.072) [0.56]	7.143*** (1.334) [1.43]	3.896*** (.726) [0.42]	0.259*** (.105) [0.27]
Mother's Education												
< HS	23.173*** (2.312) [0.82]	0.313*** (.056) [0.8]	2.758*** (.432) [0.9]	2.177*** (.465) [0.51]	7.694*** (1.157) [1.13]	2.453*** (.351) [0.5]	0.865* (.443) [1]	0.723*** (.166) [1.48]	0.505*** (.096) [1.04]	1.38** (.594) [1.16]	4.052*** (.88) [0.81]	0.254*** (.097) [0.34]
HS	29.381*** (1.59) [0.77]	0.519*** (.055) [0.77]	2.294*** (.286) [0.53]	3.231*** (.377) [0.59]	9.117*** (.891) [1.06]	2.175*** (.202) [0.44]	1.511*** (.377) [0.84]	1.249*** (.138) [1.06]	0.525*** (.047) [0.8]	3.426*** (.736) [1.23]	4.879*** (.56) [0.71]	.454*** (.075) [0.47]
Some college	32.048*** (2.072) [0.67]	0.526*** (.059) [0.55]	2.035*** (.236) [0.4]	3.333*** (.446) [0.56]	9.333*** (.825) [0.84]	2.677*** (.746) [0.52]	1.939*** (.58) [0.53]	1.624*** (.135) [0.94]	0.503*** (.046) [0.63]	4.684*** (.834) [1.42]	4.948*** (.568) [0.56]	0.446*** (.117) [0.38]
BA plus	34.459*** (1.559) [0.62]	0.529*** (.052) [0.4]	1.64*** (.211) [0.36]	2.781*** (.44) [0.50]	10.269*** (.637) [0.72]	1.506*** (.166) [0.35]	1.381*** (.388) [0.36]	2.184*** (.202) [0.83]	0.497*** (.059) [0.58]	6.227*** (1.025) [1.15]	7.082*** (.618) [0.62]	0.362*** (.092) [0.31]
Child's age:												
Preschool only	35.788*** (1.762)	0.456*** (.048)	1.85*** (.316)	2.832 (.386)	7.907*** (.664)	2.301*** (.312)	-.007 (.185)	1.062*** (.108)	0.337*** (.038)	0.806*** (.308)	18.026*** (1.251)	0.21* (.117)

School-age only	[0.62] 42.334*** (1.956)	[0.45] 0.88*** (.075)	[0.44] 2.858*** (.291)	[0.46] 3.354*** (.322)	[0.79] 13.717*** (.842)	[0.44] 2.061*** (.185)	[0] 4.198*** (.584)	[0.87] 2.623*** (.228)	[0.58] 0.804*** (.087)	[0.97] 8.499*** (1.437)	[0.71] 2.383*** (.399)	[0.49] 0.948*** (.14)
Preschool & school-age	[0.83] 33.957*** (1.393)	[0.72] 0.639*** (.044)	[0.52] 1.905*** (.15)	[0.60] 3.393*** (.477)	[0.96] 10.244*** (.579)	[0.4] 2.111*** (.361)	[1] 1.738*** (.324)	[1.09] 2.239*** (.165)	[0.8] 0.515*** (.036)	[1.44] 5.925*** (.62)	[0.59] 4.851*** (.381)	[0.58] 0.397*** (.059)
	[0.82] [0.82]	[0.74] [0.74]	[0.47] [0.47]	[0.63] [0.63]	[0.97] [0.97]	[0.49] [0.49]	[0.59] [0.59]	[1.21] [1.21]	[0.71] [0.71]	[1.51] [1.51]	[0.88] [0.88]	[0.38] [0.38]

Notes: Each coefficient represents a separate regression of an enrichment item on income, controlling for maternal age, education, and race, number of family members less than 18, number of other adults in the family and number of persons over 64, urbanicity, month effects, and year effects. Standard errors, clustered on consumer units, are in parentheses, and expenditure elasticities are in brackets.

## Appendix 4: Description of Income and Expenditure Variables in CEX

Category	Description
<b>Family income</b>	<p>Amount of CU income after taxes in past 12 months.</p> <p>Sources of income include: wages and salaries; income or loss from nonfarm business; partnership or professional practice, income or loss from own farm; Social Security and Railroad Retirement income prior to deductions for medical insurance and Medicare; Supplemental Security Income; unemployment compensation; workers' compensation or veterans' benefits; public assistance or welfare including money received from job training; interest on savings accounts or bonds; dividends, royalties, estates, or trusts; pensions or annuities; roomers or borders; rental units; regular contributions from alimony; child support payments; cash scholarships and fellowships, stipends not based on working, or from the care of foster children; food stamps.</p>
<b>Summary expenditures</b>	<p>Housing: rent; utilities; domestic and other household services; house furnishings and equipment; mortgage interest; property taxes; other lodging.</p> <p>Food: food purchased at and away from home.</p> <p>Healthcare: health insurance; medical services; prescription drugs; medical supplies.</p> <p>Transportation: new and used car, trucks, and other vehicles; gas and motor oil; vehicle finance charges; vehicle maintenance and repairs; insurance; vehicle rental, leases, licenses, and other charges; local and trip-based public transportation.</p> <p>Education/reading: newspapers and magazine; books; reference books; school books and supplies; tuition; other school-related expenses;</p> <p>Apparel: clothing for men, women, boys, girls, and children under age of two; footwear; other apparel products and services.</p> <p>Entertainment: fees and admissions; televisions, radios, and sound equipment; other equipment and services.</p>

	<p>Personal care: wigs, hairpieces, and toupees; electronic personal care appliances; personal care services.</p> <p>Cash contributions: alimony; child support; support for college students; gifts of stocks, bonds, or mutual funds; cash contributions to charities, religious organizations, educational institutions, political organizations; other cash gifts.</p> <p>Insurance &amp; retirement: life and other personal insurance; retirement, pensions, and Social Security.</p> <p>Miscellaneous: membership fees for credit cards and shopping clubs; lotteries; legal and accounting fees; funeral and cemetery expenses; safe deposit boxes; other property fees; interest on line of credit and home equity loans; occupational expenses.</p>
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**Appendix Table 5: Definitions, Additional Details, and Notes about Covariates Used in ECLS-K Analyses**

Constructs and Variables	Definition, Details, and Notes
<u>Investments</u>	
Early education program	Child participated in early education program before kindergarten (dummy variable).
Foreign language instruction	Child receives instruction in non-English language (dummy variable).
Private school	Child attends private school (dummy variable).
Extra-curricular activities	Child has ever taken lessons in drama, crafts, music, dance, or art or participated in organized athletics, clubs, performing arts (8 dummy variables).
# of children's books in home	Number of children's books in the home. Ordinal variable, ranges from 0 to 200.
# of music tapes, CDs, or records in home	Number of audio materials in the child's home. Ordinal variable, ranges from 0 to 100.
Family has computer	Computer available in home for child to use (dummy variable).
<u>Demographic Characteristics</u>	
Child gender	Boy (dummy variable).
Birth weight	Coded into the following categories: <1500 grams, 1500-2500 grams, >4500. (3 dummy variables)
Race and ethnicity	Black, Hispanic, Native American, Asian (4 dummy variables).
Family structure	Coded into the following categories: two biological parents, blended family (one biological and one non-biological parent), biological mother only, biological father only, adopted or foster parents, mother only adopted or foster, father only adopted or foster (6 dummy variables).
Father and mother's education	Less than high school degree through any graduate degree (5 dummy variables for each parent).
# of children in household	The number of children less than age 18 in the household. Ordinal variable. Ranges from 1 to 11.
Type of family's community	Family lives in a small town or rural area, suburbs or large town, or city (2 dummy variables).
Family's region of residence	West, Northeast, Midwest, South (3 dummy variables).
English only spoken in home	Child speaks only English at home (dummy variable).
Father's & Mother's employment status	Full-time (35 or more hours per week), part-time work (fewer than 35 hours per week), no work, or no such parent (3 dummy variables for each parent).
Early maternal employment	Mother ever employed between child's birth and entry into kindergarten (dummy variable).
Use of WIC	Mother or child ever participated in Women, Infants and Children nutritional supplement program (dummy variable).

**Appendix Table 5 Continued.**

Constructs and Variables	Definition, Details, and Notes
<u>Other Covariates (Measured in Kindergarten Spring and Fall unless otherwise noted)</u>	
Educational expectations	Parental Expectations for child's education: less than high school or high school through doctoral degree (4 dummy variables). (When information from Kindergarten survey was missing information was taken from the First Grade survey).
Importance of skills	Importance of skills: counting, sharing, communication, drawing, knowledge of letters (5 variables). Ranges from 1(not important) to 5(essential).
Home learning activities	Frequency of 10 activities: building things, teaching about nature, playing sports, doing art, doing chores, singing songs, playing games, telling stories, child's reading, parents' reading. Ranges from 1(not at all) to 3(everyday).
Choice of home location	Parents chose home location for current school (dummy variable).
# of days children required to attend school	Ordinal variable. Ranges from 5 to 365.
Family participation in school activities	Attendance since beginning of school year at PTA meetings, open houses, parent-teacher conference, school event; volunteered at school, participated in school fundraiser (6 dummy variables).
Parenting stress and depression composites	Two continuous variables (averages of 8 and 12 items). Higher scores indicate more stress and depression. Ranges from 1 to 4.
Spanking	Frequency of parents' spanking child in last week, ordinal variable. Ranges from 0 to 30.
Eating Habits	Days per week family usually eats meals (breakfast, dinner) together, at regular time (4 variables), ordinal variables. Ranges from 0 to 7.
T.V	Number of hours that the child watches TV on weekdays. Ordinal variable. Ranges from 0 to 24.
Visiting educational settings outside of school	Whether the child visited the zoo, library, museum, or a concert in the past month (4 dummy variables).
Neighborhood quality composite	Mean of 6 items asking about neighborhood problems. Ranges from 1 to 3.
Typical amount of sleep	Average number of hours that a child sleeps per night. Continuous variable. Ranges from 5.5 to 15.
School enrollment	Coded into the following categories: 0-149, 150-299, 300-499, 500-749, >750 (4 dummy variables).
Percent of minority in school	Coded into the following categories <10%, 10-25%, 25-50%, 50-75%, >75% (4 dummy variables).
Teacher's years at school	Continuous variable. Ranges from 1 to 37.
Teacher's highest degree	Coded into the following categories: (1) High school, associate, Bachelor degree, (2) at least more than BA, (3) Master's degree, (4) Ed. Specialist, professional diploma, doctorate (3 dummy variables).
Income	Income quintiles (4 dummy variables). The mean for the quintiles are as follows: Q1 \$9,878; Q2 \$22,950; Q3 \$37,684; Q4 \$59,202; Q5 \$121,013.

Appendix Table 6: Summary of Regressions of Kindergarten Spring Reading, Math, Externalizing Behavior, and Internalizing Behavior on Income Quintiles, Family Investments, and Covariates, by Family Income Quintile

	Reading					Math						
	Full Sample	Q1	Q2	Q3	Q4	Q5	Full Sample	Q1	Q2	Q3	Q4	Q5
Family Investments												
Preschool	-0.34** (0.12)	-0.10 (0.29)	-0.32 (0.31)	-0.59* (0.27)	-0.43+ (0.26)	-0.25 (0.28)	-0.03 (0.12)	-0.21 (0.29)	0.18 (0.26)	-0.20 (0.25)	0.13 (0.24)	-0.02 (0.27)
Drama Lessons	0.03 (0.43)	2.20+ (1.21)	-0.58 (1.36)	-0.03 (0.94)	0.07 (0.81)	-0.27 (0.58)	0.15 (0.49)	0.99 (1.23)	-0.77 (1.45)	0.34 (0.85)	0.23 (0.88)	0.05 (0.53)
Craft Lessons	-0.17 (0.18)	0.59 (0.49)	0.14 (0.60)	-0.19 (0.37)	-0.45 (0.32)	-0.36 (0.27)	0.04 (0.17)	0.21 (0.47)	0.28 (0.46)	0.21 (0.39)	-0.39 (0.30)	0.24 (0.26)
Foreign Language Instruction	0.07 (0.24)	-0.68 (0.63)	-0.06 (0.57)	0.26 (0.43)	0.27 (0.47)	-0.06 (0.35)	0.10 (0.18)	-0.49 (0.51)	-0.32 (0.53)	0.57 (0.38)	0.16 (0.46)	0.01 (0.31)
Number of Audio CDs	-0.00 (0.00)	-0.01 (0.01)	-0.00 (0.01)	-0.01 (0.01)	-0.00 (0.01)	-0.00 (0.01)	-0.00 (0.00)	-0.00 (0.01)	-0.01 (0.01)	0.00 (0.01)	-0.00 (0.01)	-0.00 (0.01)
Private School	0.11 (0.24)	0.68 (0.53)	-0.34 (0.53)	0.24 (0.36)	0.33 (0.35)	-0.38 (0.29)	0.02 (0.20)	-0.44 (0.49)	-0.11 (0.47)	-0.10 (0.32)	0.17 (0.28)	0.02 (0.27)
Music Lessons	0.21 (0.19)	-0.31 (0.64)	-0.68 (0.56)	0.04 (0.39)	0.55 (0.36)	0.50+ (0.30)	0.07 (0.18)	-0.00 (0.58)	0.03 (0.56)	-0.14 (0.39)	0.25 (0.37)	0.11 (0.25)
Dance Lessons	-0.50*** (0.14)	0.20 (0.42)	-0.16 (0.50)	-0.74* (0.31)	-0.47+ (0.27)	-0.38 (0.25)	-0.20 (0.13)	0.50 (0.37)	-0.06 (0.40)	-0.39 (0.28)	-0.40 (0.25)	0.02 (0.26)
Participate in Organized Athletics	0.30*** (0.11)	0.20 (0.30)	-0.11 (0.30)	0.71*** (0.24)	0.28 (0.21)	0.19 (0.24)	0.22+ (0.11)	-0.08 (0.27)	0.18 (0.27)	0.38+ (0.22)	0.08 (0.22)	0.39+ (0.21)
Participate in Organized Clubs	-0.01 (0.15)	-0.25 (0.40)	-0.17 (0.45)	-0.14 (0.29)	0.13 (0.25)	0.12 (0.26)	0.19 (0.13)	-0.00 (0.40)	0.19 (0.40)	0.19 (0.26)	0.20 (0.25)	0.21 (0.23)
Art Lessons	-0.45* (0.21)	-0.28 (0.74)	-0.47 (0.71)	-0.10 (0.44)	-0.60 (0.43)	-0.44 (0.30)	-0.26 (0.18)	0.16 (0.59)	-0.51 (0.63)	-0.03 (0.42)	-0.11 (0.38)	-0.54+ (0.29)
Participate in Performing Arts	0.18 (0.15)	0.36 (0.43)	0.26 (0.47)	0.47 (0.34)	-0.10 (0.26)	0.04 (0.26)	0.23 (0.15)	0.41 (0.45)	0.06 (0.43)	0.12 (0.30)	0.29 (0.26)	0.30 (0.26)
Number of Children's Books	0.00 (0.00)	0.01+ (0.00)	-0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	0.00+ (0.00)
Home Computer for Child's Use	0.42*** (0.10)	0.82*** (0.29)	0.68* (0.29)	0.20 (0.24)	0.17 (0.21)	0.45 (0.28)	0.42*** (0.10)	0.73*** (0.27)	0.56* (0.24)	0.40* (0.19)	0.19 (0.23)	0.28 (0.25)
Demographic Controls	X	X	X	X	X	X	X	X	X	X	X	X
Lagged Dependent Variable	X	X	X	X	X	X	X	X	X	X	X	X
Extended Controls	X	X	X	X	X	X	X	X	X	X	X	X
Observations	19805	3850	3153	4433	4127	4242	19805	3850	3153	4433	4127	4242
R-squared	0.64	0.54	0.55	0.61	0.63	0.66	0.69	0.62	0.65	0.66	0.64	0.67

Appendix Table 6: Continued

Appendix Table 6: Continued												
	Externalizing Behavior					Internalizing Behavior						
	Full Sample	Q1	Q2	Q3	Q4	Q5	Full Sample	Q1	Q2	Q3	Q4	Q5
<i>Family Investments</i>												
Preschool	0.06*** (0.01)	0.08* (0.03)	0.01 (0.03)	0.04 (0.03)	0.10*** (0.03)	0.04 (0.03)	0.01 (0.02)	0.05 (0.04)	-0.01 (0.04)	-0.01 (0.03)	0.05 (0.03)	-0.02 (0.05)
Drama Lessons	-0.05 (0.04)	-0.12 (0.14)	-0.05 (0.17)	0.04 (0.11)	-0.09 (0.08)	-0.02 (0.07)	-0.04 (0.05)	-0.16 (0.18)	0.16 (0.21)	0.02 (0.12)	-0.10 (0.11)	-0.04 (0.07)
Craft Lessons	0.02 (0.02)	0.03 (0.06)	0.04 (0.07)	0.04 (0.04)	0.02 (0.04)	-0.00 (0.03)	0.00 (0.02)	0.09 (0.07)	0.01 (0.08)	-0.04 (0.05)	0.07+ (0.04)	-0.06 (0.04)
Foreign Language Instruction	0.04 (0.03)	-0.02 (0.07)	0.00 (0.06)	0.03 (0.06)	-0.00 (0.05)	0.10*** (0.04)	0.04 (0.03)	0.14* (0.07)	0.02 (0.08)	0.00 (0.06)	-0.03 (0.05)	0.05 (0.05)
Number of Audio CDs	0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)	-0.00* (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00** (0.00)
Private School	0.04 (0.02)	-0.03 (0.07)	0.01 (0.06)	0.05 (0.04)	0.04 (0.03)	0.05 (0.03)	0.04 (0.03)	-0.00 (0.08)	0.04 (0.07)	0.02 (0.05)	0.03 (0.04)	0.05 (0.04)
Music Lessons	-0.01 (0.02)	0.02 (0.08)	-0.05 (0.08)	-0.02 (0.05)	0.01 (0.04)	-0.02 (0.03)	0.01 (0.03)	0.07 (0.09)	0.05 (0.09)	-0.02 (0.06)	-0.03 (0.05)	-0.00 (0.04)
Dance Lessons	0.01 (0.02)	0.00 (0.05)	0.01 (0.05)	-0.00 (0.04)	0.03 (0.03)	0.01 (0.03)	-0.04* (0.02)	-0.09 (0.06)	-0.05 (0.06)	-0.01 (0.04)	-0.04 (0.04)	-0.03 (0.04)
Participate in Organized Athletics	-0.02 (0.01)	0.04 (0.04)	-0.04 (0.03)	-0.03 (0.02)	-0.04 (0.03)	0.02 (0.03)	-0.04*** (0.01)	-0.04 (0.04)	-0.09* (0.04)	-0.06* (0.03)	-0.01 (0.03)	-0.03 (0.03)
Participate in Organized Clubs	0.01 (0.02)	-0.00 (0.05)	-0.05 (0.05)	0.06 (0.04)	0.01 (0.03)	-0.00 (0.03)	-0.00 (0.02)	0.01 (0.06)	-0.02 (0.06)	0.01 (0.04)	0.01 (0.04)	-0.00 (0.03)
Art Lessons	-0.00 (0.02)	-0.01 (0.07)	0.06 (0.08)	0.00 (0.05)	-0.07 (0.05)	0.01 (0.04)	0.03 (0.03)	0.07 (0.09)	0.07 (0.08)	0.01 (0.07)	0.00 (0.06)	0.05 (0.04)
Participate in Performing Arts	0.00 (0.02)	-0.01 (0.05)	-0.02 (0.06)	0.03 (0.04)	-0.01 (0.03)	-0.01 (0.03)	0.01 (0.02)	-0.01 (0.06)	0.03 (0.06)	0.01 (0.04)	0.00 (0.04)	0.02 (0.03)
Number of Children's Books	0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00*** (0.00)	0.00 (0.00)	0.00+ (0.00)	0.00 (0.00)	0.00 (0.00)	0.00** (0.00)
Home Computer for Child's Use	-0.01 (0.01)	-0.04 (0.04)	-0.02 (0.03)	-0.02 (0.03)	0.01 (0.02)	-0.01 (0.03)	0.02 (0.02)	0.03 (0.05)	0.02 (0.04)	0.01 (0.03)	0.01 (0.03)	0.04 (0.04)
Demographic Controls	X	X	X	X	X	X	X	X	X	X	X	X
Lagged Dependent Variable	X	X	X	X	X	X	X	X	X	X	X	X
Extended Controls	X	X	X	X	X	X	X	X	X	X	X	X
Observations	19805	3850	3153	4433	4127	4242	19805	3850	3153	4433	4127	4242
R-squared	0.53	0.53	0.51	0.54	0.53	0.53	0.31	0.33	0.32	0.31	0.31	0.32

Note. Robust standard errors in parentheses. See appendix table 5 for more detail about independent variables.

\*\*\* p&lt;0.001, \*\* p&lt;0.01, \* p&lt;0.05, + p&lt;0.1

Appendix Table 7: Summary of Regressions of Spring Fifth Grade Reading, Math, Externalizing Behavior, and Internalizing Behavior on Income Quintiles, Family Investments, and Covariates, by Family Income Quintile

	Reading					Math						
	Full Sample	Q1	Q2	Q3	Q4	Q5	Full Sample	Q1	Q2	Q3	Q4	Q5
Family Investments												
Preschool	-0.24 (0.18)	-0.59 (0.43)	-0.20 (0.47)	-0.41 (0.37)	-0.21 (0.39)	0.12 (0.45)	-0.28 (0.17)	-0.80+ (0.41)	-0.27 (0.46)	-0.31 (0.35)	-0.24 (0.36)	0.22 (0.39)
Drama Lessons-Kindergarten	0.37 (0.57)	2.00 (2.06)	0.90 (1.76)	-1.16 (1.35)	1.13 (1.59)	0.02 (0.89)	-0.81 (0.63)	0.99 (2.11)	-0.61 (2.18)	-0.67 (1.31)	-0.63 (1.40)	-1.45+ (0.87)
Craft Lessons- Kindergarten	0.28 (0.26)	-0.10 (0.83)	-0.16 (0.91)	0.45 (0.56)	-0.04 (0.49)	0.61 (0.44)	0.31 (0.22)	-0.64 (0.78)	-0.39 (0.80)	0.54 (0.51)	0.13 (0.46)	0.79* (0.35)
Foreign Language Instruction	-0.01 (0.33)	-1.68+ (0.93)	-0.21 (1.00)	-0.78 (0.81)	0.93 (0.67)	0.36 (0.53)	0.41 (0.29)	-0.67 (0.84)	-0.14 (1.00)	0.18 (0.76)	1.30* (0.58)	0.60 (0.47)
Number of Audio CDs- Kindergarten	-0.00 (0.00)	-0.01 (0.01)	-0.00 (0.01)	0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	0.00 (0.00)	-0.00 (0.01)	0.01 (0.01)	0.01 (0.01)	-0.00 (0.01)	-0.00 (0.01)
K-5: Attend Private School	0.12+ (0.06)	-0.01 (0.28)	0.36+ (0.21)	0.31* (0.13)	0.02 (0.11)	0.09 (0.11)	-0.45*** (0.07)	-0.55+ (0.28)	-0.30 (0.19)	-0.41*** (0.12)	-0.50*** (0.09)	-0.41*** (0.10)
K-5: Participate in Music Lessons	0.46*** (0.09)	0.32 (0.29)	0.25 (0.28)	0.48* (0.20)	0.75*** (0.21)	0.49*** (0.14)	0.23** (0.08)	0.31 (0.25)	0.21 (0.27)	0.44* (0.19)	0.28 (0.18)	0.13 (0.12)
K-5: Participate in Dance Lessons	-0.08 (0.08)	0.00 (0.25)	-0.00 (0.25)	-0.12 (0.18)	0.03 (0.15)	-0.10 (0.15)	-0.07 (0.08)	0.43+ (0.24)	-0.01 (0.26)	-0.22 (0.16)	-0.13 (0.17)	-0.13 (0.14)
K-5: Participate in Organized Athletics	-0.08 (0.06)	0.32+ (0.16)	-0.30+ (0.17)	0.14 (0.12)	-0.25* (0.13)	-0.27+ (0.16)	0.02 (0.07)	0.16 (0.18)	0.11 (0.17)	0.10 (0.11)	-0.09 (0.13)	-0.16 (0.13)
K-5: Participate in Organized Clubs	0.14* (0.07)	0.19 (0.23)	0.16 (0.21)	0.07 (0.14)	0.17 (0.12)	0.07 (0.12)	0.16* (0.06)	0.24 (0.21)	0.13 (0.19)	0.10 (0.13)	0.30* (0.12)	0.02 (0.11)
K-5: Art Lessons	-0.02 (0.10)	-0.31 (0.32)	0.01 (0.32)	-0.04 (0.24)	0.21 (0.25)	-0.01 (0.19)	-0.02 (0.10)	-0.05 (0.30)	0.30 (0.35)	-0.24 (0.22)	0.14 (0.20)	-0.16 (0.16)
K-5: Participate in Performing Arts	0.06 (0.08)	0.02 (0.23)	0.02 (0.25)	-0.06 (0.17)	0.01 (0.17)	0.26+ (0.15)	0.01 (0.08)	0.26 (0.21)	-0.21 (0.24)	0.08 (0.15)	-0.13 (0.16)	0.16 (0.15)
K-5: Average number of books	0.00*** (0.00)	0.01* (0.00)	0.01* (0.00)	0.00 (0.00)	0.00* (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.01*** (0.00)	0.01* (0.00)	0.00 (0.00)	0.00 (0.00)	0.00*** (0.00)
K-5: Computer	0.47*** (0.07)	0.65*** (0.16)	0.53** (0.16)	0.50*** (0.14)	0.17 (0.17)	0.35 (0.22)	0.41*** (0.07)	0.68*** (0.16)	0.42** (0.16)	0.37** (0.13)	0.18 (0.16)	0.19 (0.21)
K-5: Tutor	-3.01*** (0.16)	-2.06*** (0.35)	-3.01*** (0.41)	-3.30*** (0.36)	-3.19*** (0.35)	-3.49*** (0.35)	-1.92*** (0.15)	-1.17*** (0.32)	-1.94*** (0.36)	-2.07*** (0.35)	-2.33*** (0.36)	-2.07*** (0.33)
Received Magazine-Grade 3	0.48* (0.22)	0.72 (0.45)	0.10 (0.51)	0.21 (0.38)	0.75+ (0.45)	0.70 (0.63)	0.36+ (0.21)	0.26 (0.41)	0.20 (0.53)	0.48 (0.36)	0.28 (0.46)	0.81 (0.54)
Received Newspaper-Grade 3	0.09 (0.16)	-0.29 (0.42)	0.09 (0.40)	0.41 (0.32)	0.20 (0.33)	0.07 (0.42)	0.11 (0.16)	-0.67 (0.42)	-0.02 (0.40)	0.47 (0.31)	0.40 (0.31)	0.20 (0.37)
Demographic Controls	X	X	X	X	X	X	X	X	X	X	X	X
Lagged Dependent Variable	X	X	X	X	X	X	X	X	X	X	X	X
Extended Controls	X	X	X	X	X	X	X	X	X	X	X	X
Observations	10985	1902	1613	2448	2453	2569	10985	1902	1613	2448	2453	2569
R-squared	0.47	0.42	0.39	0.40	0.41	0.37	0.54	0.49	0.47	0.48	0.48	0.48

Appendix Table 7: Continued

	Externalizing Behavior					Internalizing Behavior						
	Full Sample	Q1	Q2	Q3	Q4	Q5	Full Sample	Q1	Q2	Q3	Q4	Q5
<i>Family Investments</i>												
Preschool	0.04* (0.02)	0.06 (0.06)	0.11+ (0.06)	0.03 (0.04)	0.03 (0.04)	-0.02 (0.05)	0.03 (0.02)	0.03 (0.06)	0.02 (0.06)	0.07 (0.05)	0.08 (0.05)	-0.04 (0.06)
Drama Lessons-Kindergarten	0.03 (0.07)	-0.02 (0.31)	0.47+ (0.26)	0.24 (0.23)	-0.09 (0.12)	-0.08 (0.10)	-0.07 (0.08)	-0.42 (0.30)	0.23 (0.24)	0.33 (0.25)	-0.34* (0.14)	-0.01 (0.10)
Craft Lessons- Kindergarten	0.06* (0.03)	0.14 (0.14)	0.24* (0.12)	0.08 (0.07)	0.03 (0.05)	0.05 (0.04)	0.07+ (0.03)	0.06 (0.12)	0.06 (0.12)	0.01 (0.08)	0.14* (0.07)	0.09 (0.06)
Foreign Language Instruction	0.04 (0.04)	-0.08 (0.13)	0.15 (0.11)	-0.04 (0.09)	0.06 (0.08)	0.03 (0.06)	-0.01 (0.04)	0.00 (0.18)	0.13 (0.11)	0.09 (0.10)	-0.01 (0.09)	-0.17** (0.06)
Number of Audio CDs- Kindergarten	0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00+ (0.00)	0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)
K-5: Attend Private School	-0.01 (0.01)	0.01 (0.03)	-0.02 (0.03)	-0.01 (0.02)	-0.02+ (0.01)	0.00 (0.01)	-0.01 (0.01)	0.00 (0.03)	-0.03 (0.03)	-0.02 (0.02)	-0.00 (0.01)	-0.00 (0.02)
K-5: Participate in Music Lessons	-0.01 (0.01)	-0.03 (0.04)	0.01 (0.04)	-0.03 (0.02)	-0.02 (0.02)	-0.00 (0.01)	-0.01 (0.01)	0.01 (0.04)	0.00 (0.03)	-0.02 (0.03)	-0.02 (0.02)	-0.02 (0.02)
K-5: Participate in Dance Lessons	0.00 (0.01)	0.02 (0.03)	-0.00 (0.03)	-0.02 (0.02)	0.00 (0.02)	-0.00 (0.02)	-0.02+ (0.01)	-0.04 (0.04)	-0.01 (0.04)	-0.01 (0.02)	-0.02 (0.02)	-0.01 (0.02)
K-5: Participate in Organized Athletics	-0.00 (0.01)	-0.00 (0.02)	0.03 (0.02)	-0.01 (0.01)	0.01 (0.02)	-0.02 (0.02)	-0.07*** (0.01)	-0.08*** (0.02)	-0.03 (0.02)	-0.11*** (0.02)	-0.07*** (0.02)	-0.04+ (0.02)
K-5: Participate in Organized Clubs	0.01 (0.01)	0.06* (0.03)	-0.02 (0.03)	0.01 (0.02)	0.02 (0.02)	0.00 (0.01)	0.02** (0.01)	0.09** (0.03)	0.03 (0.03)	-0.02 (0.02)	0.03* (0.02)	0.03+ (0.01)
K-5: Art Lessons	0.00 (0.01)	0.03 (0.04)	-0.06 (0.05)	0.04 (0.03)	-0.02 (0.02)	-0.01 (0.02)	0.04* (0.01)	0.06 (0.05)	-0.07 (0.05)	0.09* (0.03)	0.03 (0.03)	0.04 (0.02)
K-5: Participate in Performing Arts	0.01 (0.01)	0.03 (0.03)	0.02 (0.03)	0.01 (0.02)	0.01 (0.02)	0.01 (0.02)	0.01 (0.01)	-0.01 (0.03)	-0.02 (0.03)	-0.00 (0.02)	0.05* (0.02)	-0.01 (0.02)
K-5: Average number of books	-0.00 (0.00)	-0.00 (0.00)	-0.00* (0.00)	-0.00* (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
K-5: Computer	-0.03** (0.01)	-0.04+ (0.02)	0.01 (0.02)	-0.03+ (0.02)	-0.03 (0.02)	-0.02 (0.03)	-0.01 (0.01)	-0.01 (0.02)	0.00 (0.02)	-0.01 (0.02)	-0.03 (0.02)	-0.02 (0.03)
K-5: Tutor	0.04* (0.02)	-0.04 (0.05)	0.14** (0.05)	0.07* (0.04)	-0.01 (0.04)	0.08+ (0.04)	0.17*** (0.02)	0.09* (0.05)	0.24*** (0.05)	0.16** (0.05)	0.16*** (0.04)	0.19*** (0.04)
Received Magazine-Grade 3	0.03 (0.02)	0.04 (0.05)	0.00 (0.06)	0.03 (0.05)	0.07 (0.05)	-0.01 (0.07)	0.03 (0.03)	0.04 (0.06)	0.04 (0.06)	0.02 (0.05)	-0.00 (0.06)	-0.00 (0.08)
Received Newspaper-Grade 3	-0.02 (0.02)	-0.06 (0.05)	-0.04 (0.06)	-0.08+ (0.04)	0.02 (0.04)	0.01 (0.05)	-0.07* (0.03)	-0.10 (0.06)	-0.05 (0.07)	-0.08+ (0.05)	-0.04 (0.04)	-0.05 (0.05)
Demographic Controls	X	X	X	X	X	X	X	X	X	X	X	X
Lagged Dependent Variable	X	X	X	X	X	X	X	X	X	X	X	X
Extended Controls	X	X	X	X	X	X	X	X	X	X	X	X
Observations	10985	1902	1613	2448	2453	2569	10985	1902	1613	2448	2453	2569
R-squared	0.24	0.28	0.29	0.26	0.25	0.23	0.10	0.14	0.12	0.15	0.12	0.11

Note. Robust standard errors in parentheses. See appendix table 5 for more detail about independent variables.

\*\*\* p&lt;0.001, \*\* p&lt;0.01, \* p&lt;0.05, + p&lt;0.1